FOOD MANUFACTURE

Incorporating Food Industries Weekly

LEONARD HILL LIMITED, 17, STRATFORD PLACE, LONDON, W.1 JUNE 1, 1942

LASTING BEAUTY

"Staybrite" Steel is not a mere coating; its stainlessness is inherent—solidly rustless through and through—and it virtually lasts for ever.

Any operation in the working of the other noble and decorative materials can be carried out equally well in "Staybrite" Steel, the most beautiful and practical metal for a whole range of domestic products.

We are steelmakers and produce the steels from which these and other goods are fabricated. We ourselves do not manufacture the finished articles, but will gladly give the address of approved manufacturers.

"STAYBRITE"

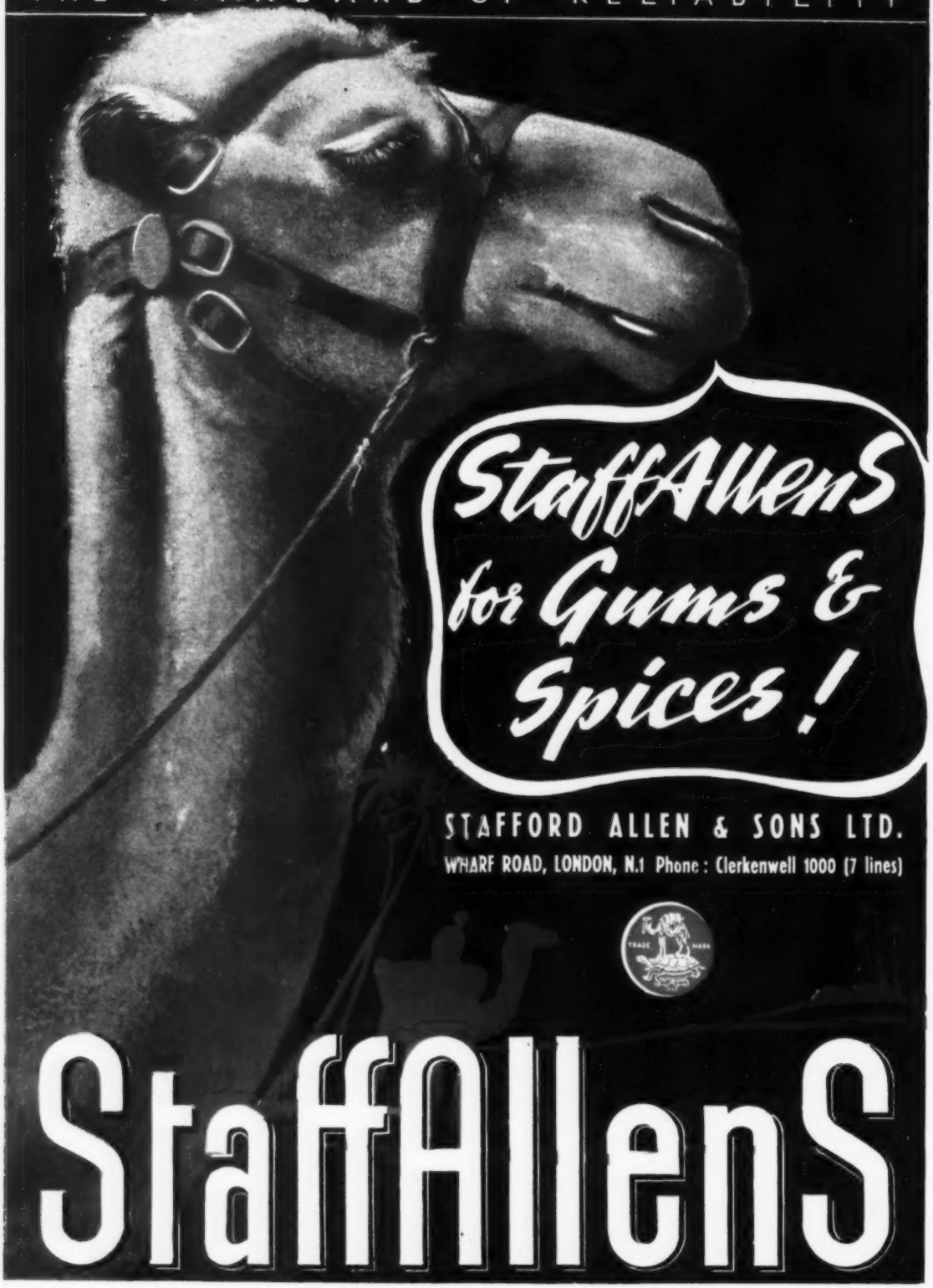
REGD. TRADE MARK

SUPER RUSTLESS STEEL

● *Owing to the large demand, we are at present greatly restricted as regards the purposes for which this steel can be supplied*

FIRTH VICKERS STAINLESS STEELS, LTD., SHEFFIELD

THE STANDARD OF RELIABILITY



StaffAllenS for Gums & Spices!

STAFFORD ALLEN & SONS LTD.
WHARF ROAD, LONDON, N.1 Phone: Clerkenwell 1000 (7 lines)

StaffAllenS

TAS/AL 81A

"Wa-HOE"

A VERY FREE TRANSLATION WOULD APPEAR TO BE "HULLO—WHAT HAVE WE HERE ?"

Anyway, I feel fairly certain that you said, or thought, exactly this when you saw the heading.

The idea, of course, is to focus your attention on this advertisement because the table at the bottom ought to be well-known to all Food Chemists, but it doesn't appear to be.

I'm afraid I'm being instructional again, but Humidity Control is one of my pet fads, and we do feel that the information may be very useful to you one day. R.B.B.

FOR NORMAL TEMPERATURES, TAKE ONE OF OUR NEW DESICCATOR CUPBOARDS.

FOR ELEVATED TEMPERATURES, TAKE ANY THERMOSTATIC OVEN (ONE OF OURS FOR PREFERENCE, OF COURSE) AND PUT ANY SEALED CONTAINERS IN IT.

THEN, BY USING SOLUTIONS AS SPECIFIED BELOW, YOU CAN CARRY OUT TESTS AT ANY HUMIDITY YOU NEED.

The data for these chemicals have been extracted from "International Critical Tables," and are given below for everyone's guidance.

DATA FOR CONSTANT HUMIDITY CONDITIONS.

The air in a sealed container in which a *saturated* solution of various salts is kept, together with some of the solid, remains at a constant humidity. If wet objects are inserted, their surplus moisture goes into the solution and more solid goes into solution until the same constant humidity conditions are restored. Likewise, if dry objects are inserted, more solid is precipitated and constant humidity is restored.

Useful salts with their percentage humidities at normal room temperatures are given below. The temperature coefficient is normally negligible for the salts given here.

Substance	*% Humidity*	*Substance*	*% Humidity*
Lead Nitrate $Pb(NO_3)_2$	98	Sodium Bromide $NaBr.2H_2O$ ...	58
Sodium Sulphite $Na_2SO_3.7H_2O$ ...	95	Calcium Nitrate $Ca(NO_3)_2.4H_2O$ ...	56
Sodium Carbonate Na_2CO_3	92	Sodium Hydrogen Sulphate $NaHSO_4.H_2O$	52
Zinc Sulphate $ZnSO_4.7H_2O$ ...	90	Potassium Thiocyanate KCNS ...	47
Potassium Hydrogen Sulphate $KHSO_4$	86	Potassium Nitrite KNO_2	45
Potassium Bromide KBr	84	Potassium Carbonate $K_2CO_3.2H_2O$	44
Ammonium Sulphate $(NH_4)_2SO_4$ ...	81	Sodium Chloride + Potassium Chlorate $NaCl + KClO_3$ ...	37
Sodium Chlorate $NaClO_3$	75	Calcium Chloride $CaCl_2.6H_2O$ ...	32
Ammonium Chloride + ... Potassium Nitrate $NH_4Cl + KNO_3$ ...	72·6	Potassium Acetate $CH_3.COOK$ ...	20
Sodium Nitrate $NaNO_2$	66	Lithium Chloride $LiCl.H_2O$ ...	·15
		Phosphoric Acid $H_3PO_4.\frac{1}{2}H_2O$ ...	9

These figures in general are correct at 20° C. The variation of humidity with temperature under these conditions is not great. The worst only move by about 0·8 per cent. per ° C. and many of them are as low as 0·02 per cent. per ° C. Where data are available we shall be pleased to assist anybody with further information on these points and can supply data for some further percentages as well if required.

TOWNSON & MERCER
LIMITED
390 SYDENHAM ROAD, CROYDON

Telephone: Thornton Heath 3851 (5 lines)
Telegrams: Townson, Croydon

— FOR — *"Service to Science"*

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Supplies are available—to old and new customers—as far as supplies permit.

Ashex Harmless Food Colours, in Liquid and Powdered types.

Ashex Concentrated Essences, for all flavouring purposes, in Liquid and Powdered types.

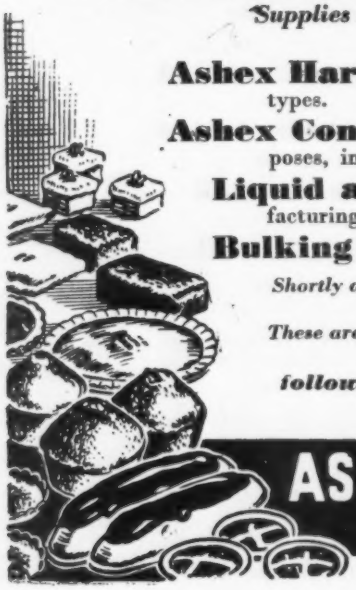
Liquid and Powdered Sweetener, for all manufacturing purposes.

Bulking and Filling Agents, for most purposes.

Shortly available—concentrated animal protein, the greatest national diet development for years.

These are only a few of the many Food Manufactures of the famous Ashe Laboratories Limited.

follow **ASHE**—*the greatest name in modern food production*



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An Announcement

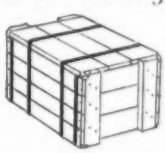
The KESTNER EVAPORATOR & ENGINEERING CO., LTD., Chemical Engineers, of 5, Grosvenor Gardens, London, S.W. 1, would like to draw your attention to the fact that the design and construction of their Chemical Plant units—Spray Driers, Evaporators, Stirrers, etc.—which are regularly advertised in this paper, are based on the practical experience which they obtained from the development and installation of numerous **complete process plants.**

The Kestner Evaporator & Engineering Company make a speciality of **complete installations** for Food and allied manufacturing processes. New processes are regularly developed by the Company's staff of experienced Chemists, Physicists, Metallurgists and Engineers, and their Works are specially equipped to manufacture the corrosion-resisting materials which are essential in the manufacture of Chemical Plant.

Whilst the exacting demands of the Government Departments must be given our first consideration, your enquiries for any type of process plant or special unit for the Food Industry are especially welcome and will be given individual attention—the Kestner Organisation is always at your service.

London. *June, 1942.*

WILL YE NO' COME BACK AGAIN? *Very plaintive; very touching; but it's no good weeping sentimental tears. Even if the damn case does come back again what sort of condition do you expect it to be in? It will no doubt get to the other end all right. A good deal battered of course: not to mention that the contents will probably have suffered somewhat. You can't expect the cases of the present day to stand up to the blows and buffets of many journeys without some form of reinforcement. No,* ***that*** *case is no' coming back again in any fit shape.*



This one is. There's no more wood on it and there're far fewer nails, but it has two ***permanent*** *bands of Seal-Less nailed at its weakest point; a few small nails to 'tack' the lid on and two more bands of Seal-Less to hold it safe and secure. You'll be seeing this case so often that it will begin to look like a relation!*

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Used in conjunction with our latest Automatic Pan Charging Plants
the output per Boiling Pan will easily reach 4 tons per day of 9 hours.

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The Russian

proverb "Measure your cloth ten times; you can only cut it once," is a useful reminder to those who have no automatic aid, but when it comes to measuring tea, you'll find that our Tea Measuring Machine will measure accurately and quickly. And in times like these, its saving will soon pay for its cost

then.. IT *must* BE A PRODUCT OF-

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CREATORS OF MODERN KITCHEN EQUIPMENT

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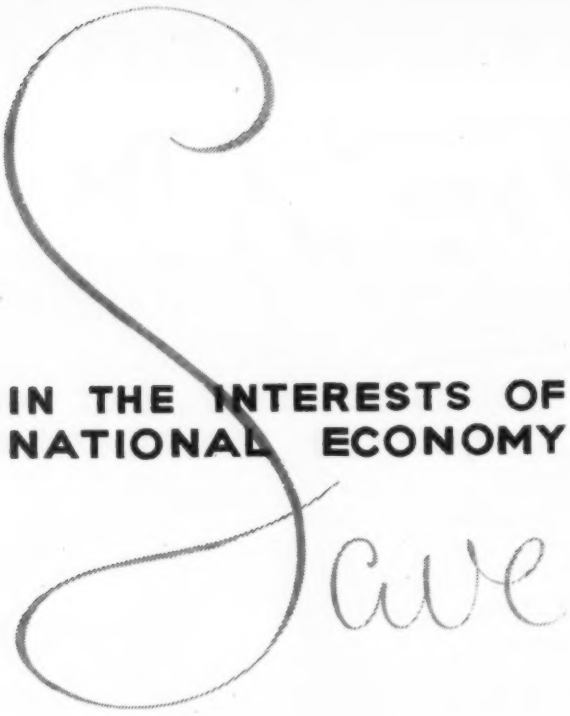

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It is very necessary that such metals which must be imported and are becoming increasingly scarce should be conserved.

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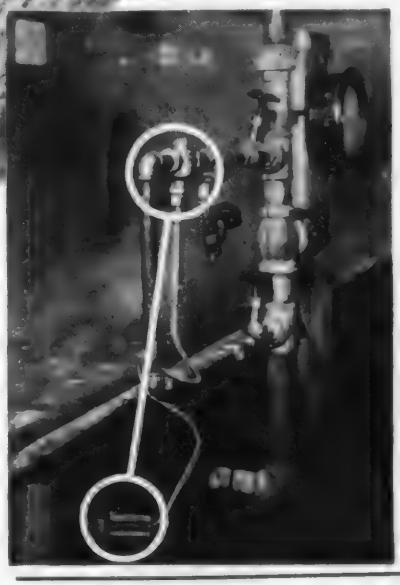
The Robot Hand



Always on the job, dependable, untiring, unfailing in its precision. He can't be called up after being thoroughly trained . . . he is "permanently reserved." He doesn't hold his hand out on pay-day, he keeps it on the valve.

What is this "universal robot"? . . . The thermostatic principle in the Sarco system of temperature control . . . thermometer and heat control valve in one . . . *inhumanly* accurate. Sarco temperature control prevents overheating, one big cause of fuel wastage; it saves money and helps the National drive for fuel economy.

You can acquire his services for little more than the cost of two weeks' wages of a skilled plant attendant.

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SARCO CONTROL

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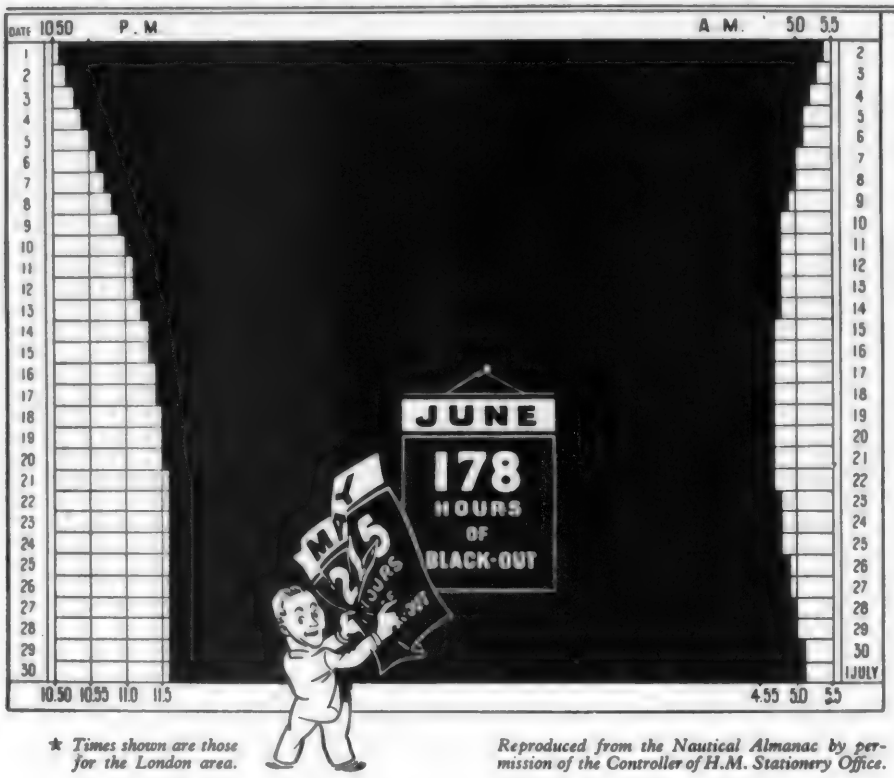
Before June is out . . .

BLACK-OUT CHART FOR JUNE



★ *Times shown are those for the London area.*

Reproduced from the Nautical Almanac by permission of the Controller of H.M. Stationery Office.

Before June is out the hours of black-out lengthen. The longest day has gone; ahead, once again, is the problem of how to bring daylight seeing conditions into the blacked-out factory.

Only the best of good lighting is good enough for making certain that output is maintained, for good lighting exhilarates and sustains the workers.

Choose carefully and wisely the lamps you use. Osram is a worth-while choice.

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THE WONDERFUL LAMP

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2

3,000 gallon Storage Tank nearing completion

STAINLESS STEEL

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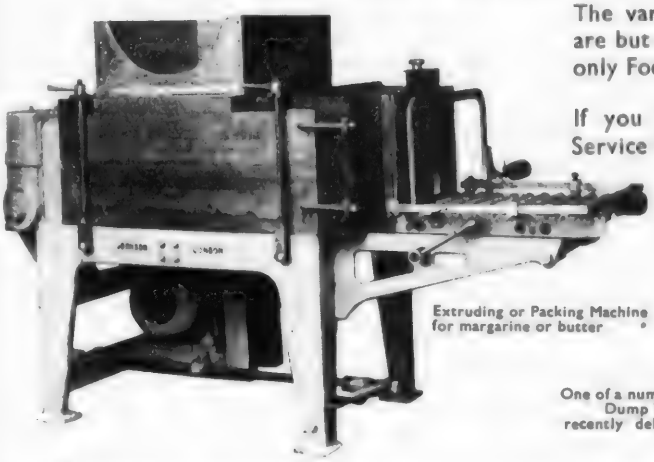
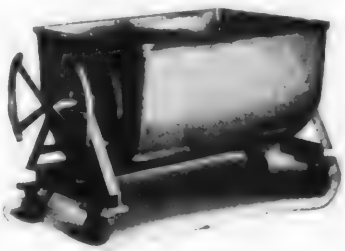
The various types of Food Plant Equipment illustrated are but a few of the things we are making to help, not only Food Manufacturers, but also the National effort.

If you are engaged on essential work our Technical Service is at your disposal at all times.



Extruding or Packing Machine for margarine or butter



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Coffee Percolators: part of an order for a well-known firm

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A Concentrated Extract with high Amino Acid content. Manufactured by Fredk. Boehm Ltd.

As a base, incorporated in foodstuffs, PROTEX has been accepted as a standard ingredient by the leading food manufacturers and is valued chiefly for its power of enhancing the characteristic flavour of almost any food preparation.

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Telephone: Beaconsfield 378

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YEASTS for all purposes

YEAST-SPREAD

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Output—150 per minute, on our No. 51 Ten-Spindle
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Lightness in moving parts, without sacrifice of strength, is essential for efficiency. Weight costs money to start moving. Weight is expensive to keep moving and to stop. Recognition of these facts led to the application of high-strength, corrosion-resisting 'Noral' aluminium alloys to a wide range of engineering products, including mine skips, machine-tool parts, crane booms and excavator buckets.

Research which produced in aluminium alloys the properties necessary for such highly stressed machinery has enabled the metal to meet the most stringent requirements for war-time uses. This work, now diverted to current applications, continues. Government contractors using aluminium are invited to discuss their problems with our Research and Development Department.

NORTHERN ALUMINIUM COMPANY, LIMITED · HEAD OFFICE: BANBURY, OXFORDSHIRE

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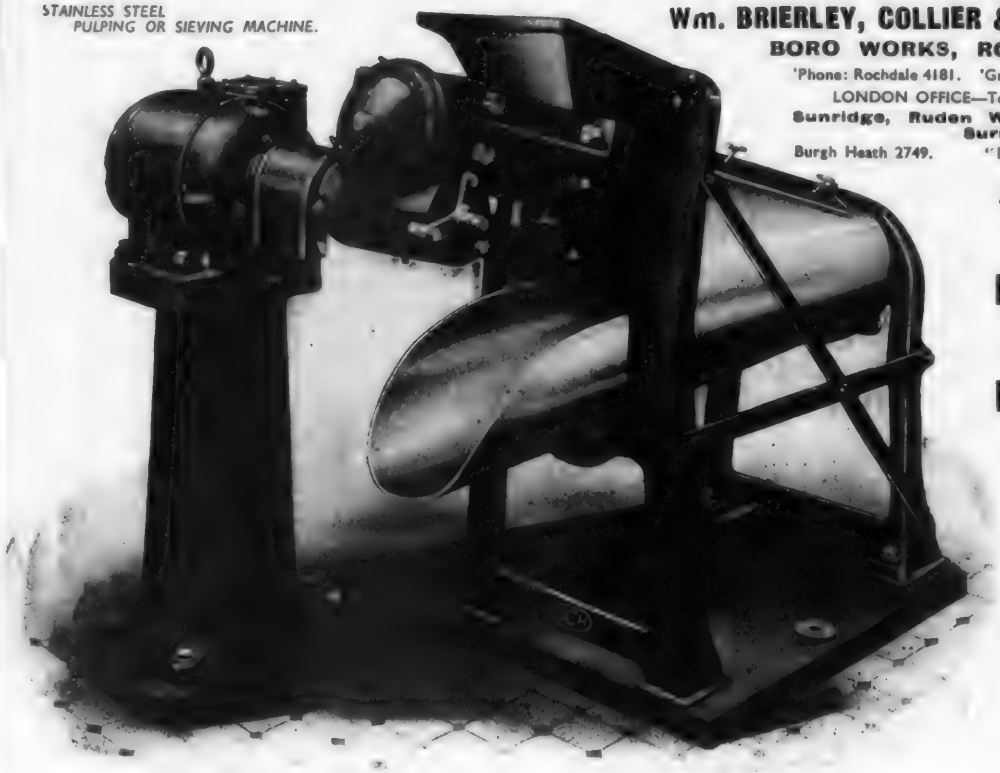

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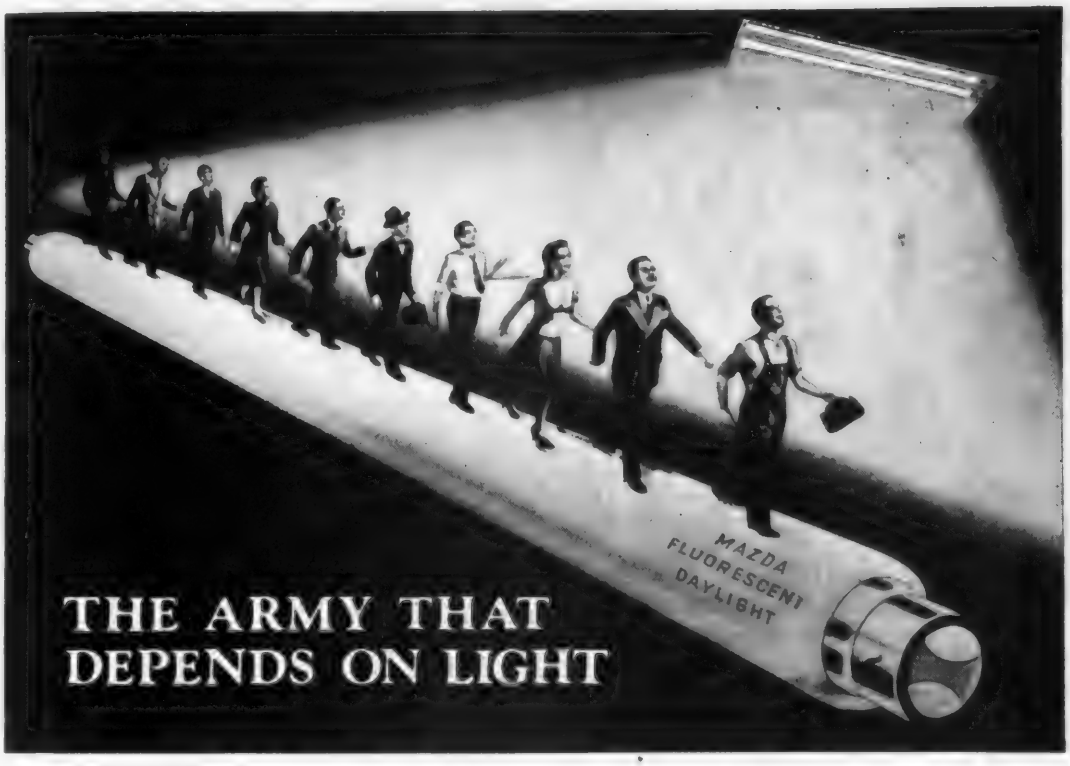

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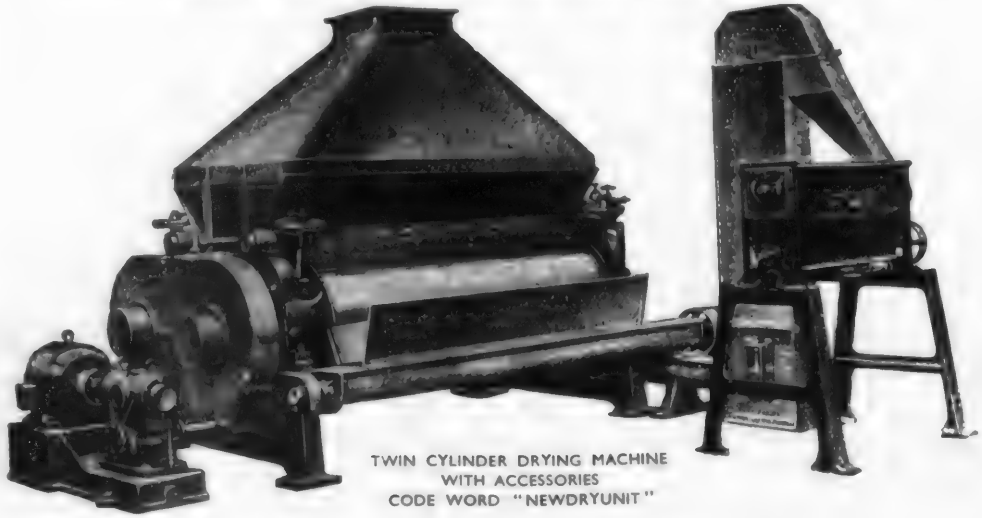

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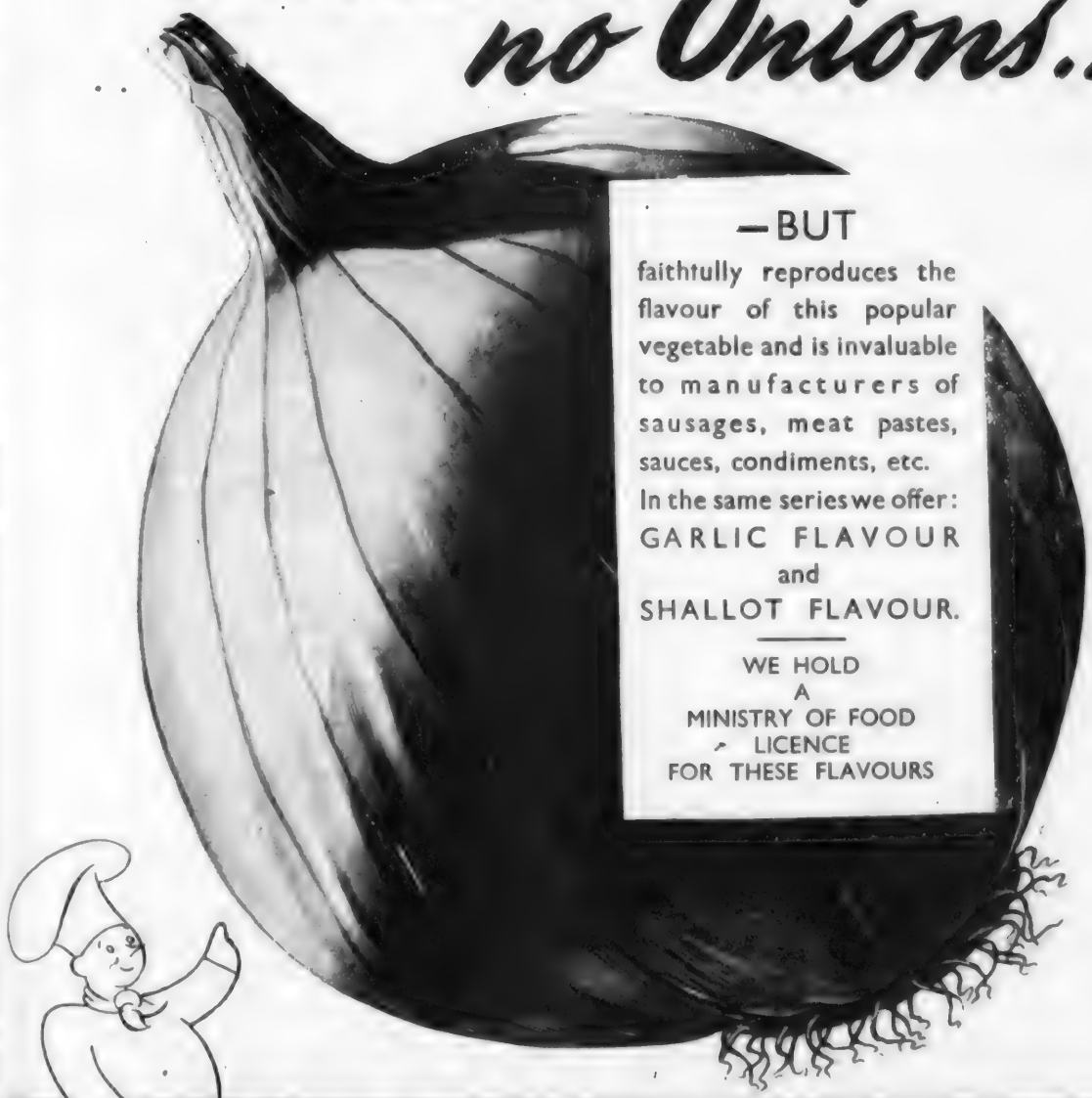

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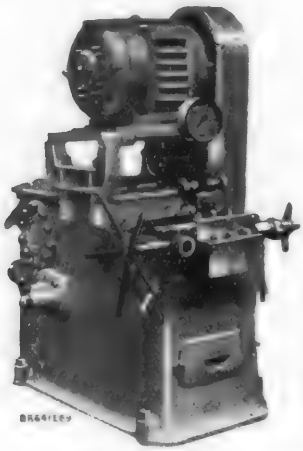

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Gold Stoving Varnish (Self coloured),
Retorting and Acid Resisting Gold Stoving Varnish,
Coating Sizes for Coloured Stoving Enamels,
Stoving Coating Enamels in agreed shades.
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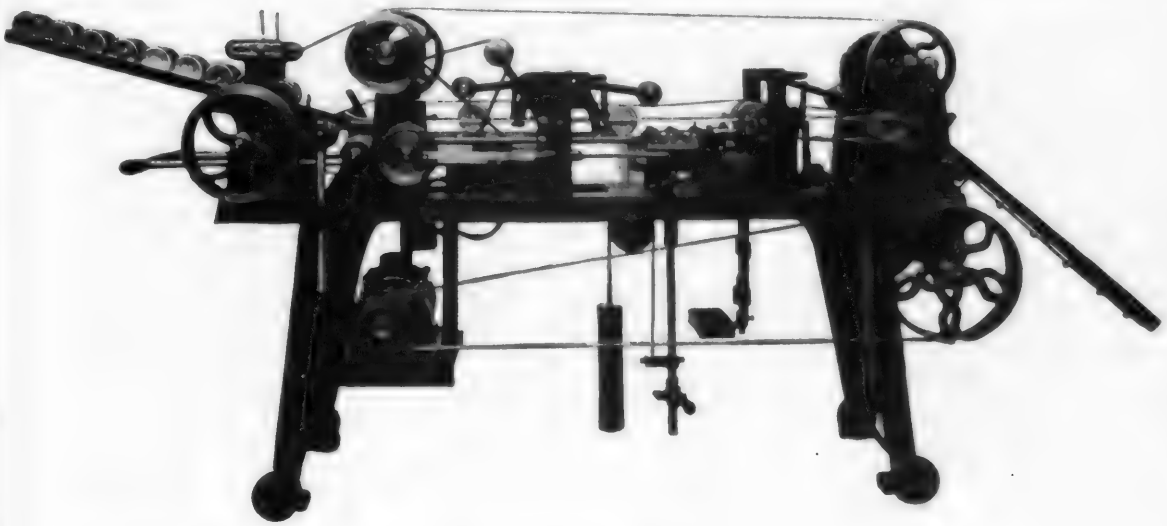
LABELLING MACHINES



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MINISTRY OF WORKS & BUILDINGS

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(Defence (General) Regulations, 1939, No. 56AAA S. R. & O. 1942 No. 761)

EVERY OCCUPIER OF PREMISES in the areas of the United Kingdom specified below must furnish to the Ministry of Works & Buildings a return of any accumulation on those premises of 3 tons or more of metal suitable for scrap. Returns must be made on a prescribed form★ within 30 days of 14th May, 1942, or of any subsequent day on which such an amount of metal suitable for scrap is brought on the premises.

The areas to which this notice applies are :

The LONDON CIVIL DEFENCE REGION
The County of ESSEX
The County of DORSET
The County Borough of BRISTOL
The County of NOTTINGHAMSHIRE
The County of MONMOUTHSHIRE
The County Borough of LEEDS
The Counties of EAST, WEST and MID-LOTHIAN

Returns from other areas will be required in due course

Metal is deemed suitable for scrap if it is, or forms part of, any building, structure, machinery, plant, or article which is disused, obsolete or redundant, or otherwise serving no immediate purpose.

Aluminium and magnesium, and alloys of either of them, are exempted from the Order.

Under the Order "Premises" means any building or land having an assessment under Schedule A or subject to a valuation for rating.

Returns are NOT required where :—

(*a*) The Board of Trade certify that the metal is, or forms part of, machinery or plant that is disused or spare in consequence of a concentration scheme approved by them.

(*b*) The metal forms part of stand-by plant or equipment held by Public Utility Undertakings and essential for the performance of the statutory obligations of those undertakings.

(*c*) The metal forms part of a machine tool of any of the descriptions specified in the first schedule to the Control of Machine Tools (No. 9) Order 1941, or a cutting tool of any of the descriptions specified in the first schedule to the Control of Machine Tools (Cutting Tools) (No. 1) Order 1942, or any Order replacing or amending them.

(*d*) Returns in respect of the metal are already made under the Industry (Records & Information) Orders 1940 and 1941.

★ **FORMS on which returns must be made are obtainable from the Director of Demolition and Recovery (Scrap Metal Order) Ministry of Works & Buildings, Sanctuary Buildings, Great Smith Street, London, S.W.1.**

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FOOD MANUFACTURE

Vol. XVII. No. 6 · Published Monthly · June, 1942

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FOOD MANUFACTURE

Vol. XVII, No. 6 June 1, 1942

The National Bread

THE eighty-five per cent. wheatmeal loaf is now a commonplace. People seem to be settling down to its consumption quite nicely. There are, of course, a few complaints, one of them being that it gets dry quickly and is crumbly. The bread will doubtless improve as time goes on and the bakers get the hang of the new flour. The National Association of Bakers, Confectioners and Caterers has taken prompt action in providing a series of lectures throughout the country to assist bakers to overcome difficulties, and has offered to make a generous contribution to federations and local associations towards the cost of arranging meetings for the same purpose.

The trade press, as a whole, has taken the new Order in a helpful spirit. The *N.A. Review* has said that "the trade is ready to respond". A writer in the *British Baker* expresses himself more in sorrow than in anger; indulges in wistful memories of cottage loaves; promises not to complain about the absence of white bread during the war, but warns us that he will not let "the faddists—the doctrinaire, short-sighted, illogical faddists—so full of incomplete facts, so devoid of wisdom, think that we will not welcome back with open arms, when the war is won, the white bread of this country—the best bread that has ever been produced in the world".

The *Lancet* discounts some of the fears expressed by some members of the medical profession that dire things like spastic colon and ulcerative colitis may be the National bread-eaters' future lot. But, pointing out that 85 per cent. flour is not, like white flour, purine-free, asks how the uric acid formed during metabolism will affect gout. The suggestion, however, is made that the doctors need not worry about that until more is known about its pathology. Here is one more of what Professor Drummond recently described as "disconcerting gaps in our knowledge". It is certain that the protagonists in the dietetic arena will be on the alert to record results, and perchance some of the gaps may thereby be closed. In the meantime we feel that a little agnosticism is not an unreasonable attitude, if only a temporary one. We rely upon the activities of the experts to supply grounds, in due course, for a more positive doctrine.

Undulant Fever and Pasteurised Milk

The extraordinary idea is apparently firmly fixed in the minds of many laymen that Guernsey cows, pedigree for choice, are miraculously immune from disease. Time and time again they have assured us that there is no danger to be feared from unboiled milk obtained from some home farm or other having a herd of such high-toned cows.

What is described as a small outbreak of undulant fever in a girls' school is reported in the *B.M.J.* (April 25, 1942), in which milk was clearly the source of infection. The milk supplies to the school were obtained from the home farm on the estate, and unheated milk was drunk at breakfast and supper. The girls had been accustomed to a pasteurised supply in the town before the school had been evacuated to the country.

In connection with this case one of the authors recorded the findings in a boys' boarding-school in which samples of blood from 160 boys were taken. Since it was ascertained that these boys had consumed raw milk over a period of years, it was thought worth while, in view of the fact that 20 to 30 per cent. of herd samples in Great Britain are infected, to test their sera for agglutinins to *Br. abortus* (Oxford Standards Suspension). The results were as follows:

Total number of sera, 160. Negative at 1 in 20, 153. Positive at 1/20, 7 (4·4 per cent.); 1/40, 4 (2·5 per cent.); 1/80, 3 (1·9 per cent.); 1/160, 2 (1·3 per cent.); 1/320, 0. There was no history of diagnosed clinical cases among these boys, but it seems clear that the consumption of raw milk has produced enough latent infection to raise the frequency of anti-bodies to *Br. abortus* to a level considerably above that found in the population at large. It is not unlikely that certain obscure ailments in the past were, in fact, milk *Brucella* cases.

People will jog along comforted by the fact that you have to drink lots of raw milk to catch undulant fever, but the catch in it is that you will not be sure to which class you belong until you are down on your back with it. We have seen undulant fever working on several friends of ours and this was sufficient to convince us that it is by no means a pleasant disease. Prevention is easy—pasteurise all milk.

Egg Substitute

Stating that the prosecution had been impeded all the way by a Ministry of Food licence, the Stipendiary Magistrate dismissed summonses against four firms for offences arising out of the sale of an egg substitute. The product in question, which was stated to contain 96 per cent. dyed blended flour, 3 per cent. bicarbonate of soda, and 1 per cent. gum, was licensed by the Ministry, and until that licence was revoked and a sale took place after revocation there was a perfectly sound defence. These substitute cases appear to get more complicated every day, and this is the first time we have noted that a magistrate has mentioned hampering of the prosecution by Ministerial action. It has been usually maintained that the holding of a licence does not exclude prosecution for offences against the Food and Drugs Act, upon which the prosecution in this case depended.

Anti-Vaccination Advertisements

The vaccination controversy has been going on for many years, oft-times with considerable virulence. It has recently been associated with the important issue of the right of free expression of sincerely held opinion. The Secretary of the National Anti-Vaccination League has protested against the attempts of the Ministry of Health to induce those newspapers that are members of the Advertising Association to boycott the League's advertisements. The published correspondence between Mr. A. Morgan Williams and G. Russell Chapman, Secretary of the Advertising Association, is interesting. The former says that he understands that the Press is a prohibited area for the Anti-Vaccination League for ever and ever, and that this is a gross injustice, if correct. The reply, which Mr. Morgan Williams characterises as "leaving the whole thing in mid-air", was, in effect, that the Government has spent a lot of money to persuade parents to have their children immunised against diphtheria, and that the Advertising Association passed on the Government's views. Further, that publishers will exercise their undoubted freedom to accept or reject anti-vaccination advertisements. Constitutional ways of curbing the opposing side involve a Bill in Parliament and a first-class controversy (save for the implications of time involved in wartime, we are inclined to ask: "Why not?"). Mr. Chapman finally says that "the simple facts are that your money is being used by the Government to persuade people to have their children immunised against diphtheria. A private body comes along and tries to undermine that effort by counter-advertising. Such advertising might be so subtle and clever as to blind the Press to the fact that the Government, acting for us all and in our general interests, is being undermined".

Beer or Eggs ?

These were discussed in the House of Lords on May 12, and doubtless a few hours afterwards in all the four-ale bars in the country. More beer was being drunk than before the war, but the excess was made up of water, which, as Lord Woolton said, is a beverage approved of by the highest authorities.

During the debate there were presented some very conflicting statistics. Lord Arnold said that if half the barley used for beer were diverted to poultry food it would feed 18,000,000 hens and raise the egg ration by 4 eggs per week. In his reply, Lord Woolton stated that it would merely raise it by 1 egg per month. Lord Woolton should know, but we should like to know the figures upon which Lord Arnold based his sky-high estimate.

Lord Arnold also said that he put the heavy drinkers at 5,000,000 to 7,000,000 out of the population of 46,000,000. What are heavy drinkers? How many pints (or quarts) per day constitute their consumption? And how many moderate drinkers are there?

Taking for granted that, even after counting all classes of beer drinkers, their percentage of the population is not an impressive figure, it must be remembered that this minority is an important one. Included in it are those agricultural workers who, after arduous ploughing and other work, go to their "club"—the village inn—and indulge in the only recreations and opportunity for discourse they have. They are duly grateful to Lord Woolton for his refusal to ration beer. It would not only be beer that he would be taking away, but the only social amenities available to an important section of the community—a section constantly being spurred on to more and more effort.

The Nutritive Properties of Monoglycerides

Some interesting work designed to study the comparative utilisation and metabolism of synthetic and natural glycerides by the rat is described in a paper by W. Q. Braun and C. L. Shewsbury. Monostearin and monolinolein were used for the experiments. The monostearin had a melting point of 81° C. The sample of monolinolein was not pure but contained 20 per cent. of mono-olein. Neither sample contained diglycerides. The authors summarise their results as follows: (1) Monostearin, monolinolein, and lard, as compared in the rations studied, were found to be practically equal for the growth of rats. (2) Stearic acid from monostearin was not stored to any appreciable degree in the body fat of rats. (3) Linoleic acid from monolinolein was apparently stored directly in the body fat of rats. (4) Fatty acids fed as monoglycerides appear in the depôt fat of rats as triglycerides.

The Rationing of Confectionery

The scheme of rationing of confectionery will come into force on July 27, and it is expected to effect fairer distribution to the public, especially in regard to people engaged all day.

In announcing the scheme at a recent Press Conference, Lord Woolton said that he had had many appeals from the public to put chocolate and sugar confectionery under a rationing scheme, and also equally strong appeals from traders who were anxious both to obtain fair supplies and to distribute them fairly when they got them.

Some repercussions of this announcement do not coincide with the opinion of the traders mentioned. Strong opposition was expressed at a meeting of the Portsmouth branch of the N.U.R.C. It was stated by the chairman that, in his opinion, points rationing would mean the death of every retail confectioner in the country, because it was obvious that the housewife would simply deposit her points with the grocer and get her chocolate ration with her grocery order. This is probably what will happen; consumers will take the line of least resistance and be unwilling to make of shopping even a slightly more onerous task than it is already.

Curing Agents and Anaerobic Spores

Jansen and Hess (1941) came to the conclusion that "both theory and practice of curing meat and canning cured meat teach that nitrate is an invaluable ingredient and, for most cures, should not be omitted". Tanner and Evans (*Zentralbl. f. Bakt.*, 1933, 1934-A, 1934-B) concluded that commercial curing mixtures (sodium chloride, sodium nitrate and sodium nitrite) were effective in preventing growth and toxin formation when the proportions of curing mixtures to medium were such that the critical concentrations of sodium chloride were approximated. Yesair and Cameron state that these observations would suggest a non-specificity in regard to the inhibitory action of the salts which were studied, and have proceeded with a series of experiments on the subject.

They found that the curing salts mentioned above exercise inhibitory effects in different degrees, individually and compositely. In a meat infusion agar, greater than 70 per cent. reduction in spore counts was brought about by the introduction of 0·1 per cent. nitrate, or 0·005 per cent. nitrite, or 2 per cent. chloride of sodium. Salt combinations representative of curing practices may result in a growth reduction of 100 per cent.

The effect of the curing salts on the thermal death-point time of the test organism (which was *Cl. botulinum* No. 62-A) is apparently to reduce the time at temperatures lower than 230° to 235° F., and the slopes of the thermal death-time curves are greater when the salts are added. When spores of *Cl. botulinum* are incorporated in cured meat and thermal death times compared with those of the spores incorporated in uncured meat, the inhibitive effects of the curing salts are apparent, but when the heated medium is subcultured in a liquid medium there is no destructive influence. Resistance values determined by subculture after heating are approximately the same in the cured and uncured meat.

Restaurant Meals

The new Order fixing a maximum price on restaurant meals comes into force to-day, June 1. The maximum price of a meal served in a public restaurant will be 5s. A house charge up to 7s. 6d. is to be allowed. This, it is stated, is to meet the claim made by the more expensive restaurants and hotels to be permitted to make a charge more in accord with what they have hitherto charged. "Amenities" are to be charged for and will be limited to 2s. 6d. Tips are to be 10 to 15 per cent., so that in some establishments at least the basic charge of 5s. may rise to about 16s. In fact, matters will be more or less as they were before. One sensible provision, however, is that which will prohibit the sale of fish, game and poultry dishes on certain days of the week.

The suggestion recently made that the best solution might be the imposition of the double purchase tax on all meals costing more than 2s. 6d. is a good one, enabling, as it would, those who wish, to dine "not wisely" (in view of wartime conditions), perhaps not "too well", but certainly not badly, and who have the wherewithal to do it.

That Wheat Grain

Dr. Bailey, Dean of the Department of Agriculture and Director of Biochemical Research, University of Minnesota, stated recently that "there is a sort of halo or glorification of vitamin B complex which is not justified by scientific facts. The wheat grain was not produced to feed you and me; it was produced for renewing the species of wheat". This opens up quite a lot of questions. The primitive wild wheat did not make a very good job of its work in producing more wheat, and it is possible that if man had not taken a hand it might have died out long since. It is true that wheat was not made for man, but also that man developed on certain lines, due in part to the wheat he ate. The composition of wheat changed as its cultivation proceeded, just as the composition of tomatoes, with respect to vitamins, etc., has been shown to undergo considerable changes as a result of modified methods of cultivation. Hence, by these modifications, man gradually created other necessities for his bodily well-being. But there can be no doubt that man and wheat have much to thank each other for, if evolution is worth anything.

Flavours in Wartime

The importance of flavouring agents in food has been accentuated as a result of the war, the foods having naturally agreeable flavours having become less plentiful. The author discusses the sources of supply and present availability of the main flavouring materials at the present time.

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IT IS DIFFICULT, if not impossible, to overestimate the importance of flavour in food and drink. The aromatic substances to which flavours are due are not foodstuffs in the sense in which the term is applicable to either carbohydrates, fats or proteins; but they are, equally with the vitamins, deserving of being called "accessory food factors". Their presence stimulates the secretion of the gastric juices and thus facilitates good digestion. A flavourless meal is an indigestible meal, and its real food value is thereby diminished.

Natural Flavours

Some foodstuffs are naturally endowed with agreeable flavours. One might instance cheese, butter, game, and many types of meat and fish, though even in the cases of these foods the flavour may be enhanced, modified, and rendered more agreeable by suitable additions of aromatic materials, in such forms as made mustard, sauces, stuffing, etc. Other foodstuffs are relatively insipid, and call for the careful addition of suitable flavouring materials in order to make them really palatable. This is more especially the case with foods of the cereal type.

In the days before modern refrigeration was evolved, and fresh meat was unobtainable all the year round, spices were in big demand in this country, not only because their flavours were enjoyed, but also to preserve dried meat. They were also highly valued in medicine as, to use modern terminology, carminatives and antiseptics. If we turn our eyes to the East, we also observe spices to be lavishly employed to retard the bacterial decomposition of meat and to be greatly in demand by those races whose staple diet is rice, in order to give variety to this diet and to render it palatable.

Wartime Changes in Diet

As a result of the war, the diet of this country has undergone a very considerable change. We are all eating much less meat and far more cereals and other vegetable foodstuffs. Hence the war has accentuated the importance of flavouring materials and rendered the need for an abundant variety very necessary. Compare, for example, the composition of a present-day sausage with a pre-war sausage of first-grade quality. It is obvious that to render the present-day sausage a suitable article of diet more flavouring material is required than prior to the war, and that considerable care in the selection of its constituents is also demanded.

Since many foodstuffs are, as already mentioned, naturally endowed with full and satisfactory flavours, it is not possible to draw a hard and fast line of division between foods and flavouring materials. In which category, for example, should we place the onion? Its food value is unquestionable, and so is its flavour. It may be served as the main constituent of a dish, or it may be used to flavour other foods.

Four Groups of Flavourings

In general, however, flavouring materials may be roughly divided into four main groups—namely, (i) flavours derived from spices, (ii) flavours derived from herbs, (iii) flavours derived from fruits, and (iv) synthetic flavours. The first three groups are "natural". The flavouring material pre-exists in the portion of the plant from which it is obtained, though slight adventitious chemical changes may be involved in the process of winning adopted. In general, these changes are negligible or nil in the case of cold extraction processes. They may be more pronounced when distillation is adopted. For example, acet-eugenol is one of the essential aromatic constituents of cloves. Careless distillation may result in its destruction to a large extent, with the production of a clove oil of only second-rate flavour.

Spices Defined

The term "spices" seems never to have been precisely defined, but is sometimes applied to dried aromatic vegetable products of exotic origin. I prefer to employ it for all dried aromatic vegetable products other than those consisting of the herbaceous portions of plants, reservng the term "herbs" for the latter. "Fruits" is used in the classification in the commercial rather than the botanical employment of the term, since the so-called aromatic seeds (caraway, dill, fennel, etc.) which I classify as "spices" are, botanically speaking, "fruits".

The word "synthetic" is also rather loosely used to designate all flavouring materials obtained by deliberate chemical changes, not necessarily only those of a building-up nature. In general, so acute is the human flavour sense, that purely synthetic flavours never compare favourably with their natural counterparts; in actual practice they are usually employed only after blending with suitable flavouring material of natural origin. It does seem possible, however, for the public to develop a positive liking for a synthetic flavour, and I believe I am correct in stating that in this country the flavour of synthetic vanillin, well toned up with coumarin, is actually preferred to that of natural vanilla.

Forms of Flavourings

To a large extent, for flavouring her dishes, the British housewife uses spices and herbs in their crude form after they have been comminuted; ground spices and herbs are also employed in some food industries. I was informed that, prior to the war, folk in some part of Great Britain liked to see little specks of sage in their sausages, while in other parts this appearance was disliked.

The essential oils won from herbs and spices by means of steam distillation represent their aromatic materials in a highly concentrated form, though occasionally, as already indicated, with some slight losses. Losses in " tastes " as distinct from flavours are often greater. This is sometimes a distinct advantage—for example, in the case of products, such as cloves and cinnamon, containing tannin, which renders the taste of the crude spice somewhat astringent. On the other hand, the loss becomes serious in the case of spices such as ginger, containing non-volatile pungent material, and which are valued on account of their pungency. In cases of the latter type, the essential oil cannot be used to replace the crude spice; but highly satisfactory pungent and aromatic material can be obtained by suitable extraction methods.

In general, the essential oils are too concentrated for convenient handling by food manufacturers. Very small proportions are necessary, and the satisfactory incorporation of a small quantity of a fluid in a large mass of material is definitely a precarious undertaking. Hence " essences " are preferred, consisting of essential oils or blended aromatics dissolved in a suitable menstruum. This is usually dilute ethyl alcohol, but for some purposes solutions of the aromatic materials in fixed vegetable oil are to be preferred. The preparation and use of these are fully described in *Food Industries Manual* (eleventh edition).

Essences can also be prepared by maceration of the crude herb or spice in alcohol, and, in some cases at any rate, the process gives products of better flavour than those made from essential oils. Often a combination of the two processes is adopted, the extracted essence being fortified by the addition of the appropriate essential oil.

Fruit Flavours

The case of the fruit flavours is different, since it does not seem practicable to obtain satisfactory flavouring material from these by means of distillation. Except in the case of the *Citrus* fruits, the flavour is usually contained in the juice, and this can be concentrated by suitable means for the production of flavouring essences and fortified, if necessary, by the addition of suitable synthetic aromatics. Research directed to the production of synthetic flavours has been mainly concerned with fruit flavours, and there have been many notable achievements, not all of which by any means have received the light of publication. One " fruit " (or should it be " vegetable "?), the flavour of which has so far eluded the art of the chemist, is the tomato. A satisfactory synthetic tomato flavour would be very welcome at the present time, but remains to be invented. Perhaps one day the tomato will yield up the secret of its peculiar and generally popular flavour to the analytical chemist; meantime it is remarkable that many folk's palates accept as satisfactory suitably coloured citric acid crystals as a substitute for tomatoes for flavouring for soups, etc., no doubt enjoying the acid taste developed.

The *Citrus* fruits (oranges, lemons, limes, grapefruit, etc.) are quite exceptional, since the bulk of the aromatic oil they contain is concentrated in cells in the peel, being present in proportions so great that direct expression becomes practicable. The juices of these fruits, though pleasantly flavoured and agreeably acid to the taste, actually contain very little essential oil indeed. On the other hand, they are relatively rich in ascorbic acid, notably in the case of oranges and lemons, and for this reason the juices of these fruits have assumed positions of great importance in modern times; and it is mainly on account of this important characteristic that their importation into this country during the war is permitted.

Control of Imports

All imports of flavouring materials are controlled, with the result that herbs and spices are difficult to obtain and prices have risen. However, the responsible powers look with favour on the continuance of adequate supplies of flavouring material for the improvement of meat and vegetable products, and of the *Citrus* juices and concentrates. Dealers and users have been assigned their quotas, while the importation of products considered to be unnecessary has been prohibited.

Of other fruit juices which may be regarded as important from the point of view of flavour, and are also important sources of ascorbic acid, mention must be made of red currant juice and black currant juice, because the fruits are cultivated in this country. Black currant juice is very much richer in the vitamin than any of the *Citrus* juices, and for this reason its expression for general distribution has been prohibited; the product has been reserved for the manufacture of syrup for the use of infants and for medicinal purposes only. Hence, as a flavouring agent for general use, black currant concentrate and essence has been temporarily lost to manufacturers of such products as table jellies and confectionery.

Exotic Spices

The East is the proverbial home of spices, and prior to the war and developments in the Far East a considerable proportion of the nation's supply of spices came from lands now in enemy hands. Fortunately, however, spice production had been developed in other parts of the world, notably Africa and the West Indies, so that the position is not so desperate as it might otherwise have been.

The following is the position so far as the chief spices of exotic origin are concerned:

Allspice (Pimento).—This is a product, not of the East Indies, but of the West Indies, especially Jamaica. The essential oil is available, as well as reasonable amounts of the spice itself, which is specially useful owing to the composite character of its flavour.

Cinnamon.—The finest quality comes exclusively from Ceylon, and the essential oil is still being distilled over here from imported material.

Cloves.—The fine Penang cloves are temporarily lost to us, but they represented but a small fraction of the cloves consumed in this country. Zanzibar is the largest producer, followed by Madagascar (now in process of occupation by the Allied Nations). Both the

spice and the essential oil are said to be coming in quite well, so that first-rate vanillin, made from the oil, is in fair supply.

Ginger.—This spice is scarce, but there are still some stocks in the country. The chief centres of production open to us are Jamaica, India, Sierra Leone.

Nutmegs and Mace.—These spices will certainly become scarcer, as we are cut off from supplies from the East Indies; but Grenada remains, and there are fair stocks over here.

Pepper.—Both the spice and its essential oil have become very scarce owing to the position in Malaya. A substitute is desirable. Red pepper and grains of paradise are both interesting in this connection.

Star-Anise.—The product exclusively of two small districts in South China and French Indo-China, further supplies of this spice will be unobtainable. Fortunately, perhaps, the anise flavour is one not in big demand in this country. In any case, star-anise oil can be admirably replaced by true anise oil (from *Pimpinella Anisum* Linn.) of Spanish origin. Actually this latter oil is a finer product, hitherto rather neglected on account of its high price as compared with star-anise oil.

Vanilla.—It is interesting to note that beans of quite good quality are on offer from time to time from Uganda.

The position as regards herbs and spices which could be grown in this country is so far from satisfactory as only to be described as deplorable. In spite of the lesson of the last war, the nation soon slipped back into a state of reliance on foreign countries for her supplies of very many necessary plant products which could be produced here, and, in some cases, were once produced here in substantial quantities.

Caraway, once grown on a commercial scale in the Eastern Counties, is now practically unobtainable, since the industry was allowed to pass entirely to Holland. Possibly the best substitute is dill, though the flavour is not quite so spicy and agreeable. Last year I noticed that some makers of cakes were using dill seeds instead of caraway seeds to decorate the tops of so-called "caraway seed cakes". Some dill is grown in Suffolk, but I am informed that the position as regards dill is just about as serious as that regarding caraway, the small amount of dill produced in this country presumably being reserved for medicinal use. There are spasmodic shipments of Indian dill, but this is an inferior article of relatively poor flavour, and its oil contains the toxic dill-apiol. Little progress appears to have been made in the synthetic production of carvone, the characteristic aromatic constituent of caraway and dill oils.

British Herb Production

There has been a good deal of propaganda on the part of the Ministry of Agriculture and in horticultural journals in favour of increased herb production in this country, and a number of small books on the subject have made their appearance. Emphasis, however, has been laid more on medicinally important herbs such as digitalis, stramonium, and belladonna, rather than on those chiefly valued for their aromatic properties. The Ministry's Bulletin No. 121—apparently a hurriedly and rather shoddily prepared abridgement of Bulletin No. 76 on *Herbs*, published in 1936—deals mainly with *Medicinal Herbs and their Cultivation*, but some aromatic plants, including caraway, coriander, dill, parsley, anise, peppermint, etc., are included because some are of medicinal interest. By far the most useful book on the subject which the war has called forth is Miss D. G. Hewer's *Practical Herb Growing*, published last year. This is veritably a practical book by a practical herb-grower, and covers economically important herbs of all types, a special chapter being devoted to the subject of drying—a subject of outstanding importance, too frequently overlooked or inadequately treated by writers on the subject of herbs lacking practical experience in their commercial cultivation.

Probably there are more aromatic herbs being grown in private gardens and allotments to-day than for a long time in the history of the nation; but, looking at the matter from a commercial point of view, the propaganda does not appear to have borne much fruit. Actually, of course, in the case of some herbs, the effects of increased production commercially would not be immediately felt.

Oils Which Should be Plentiful

There should be no shortage of such oils as angelica, basil, marjoram, thyme, sage, fennel, celery, lovage, etc.; but it would be definitely untruthful to say this is actually the case. I am informed, for example, that the only sage oil available is that from Spain, which is of poor quality owing to its cineole content. Basil oil has been offered from East Africa, and marjoram oil from the Belgian Congo. Thyme oils are sometimes imported from the East, and synthetic thymol is also available as the basis of a substitute. Angelica and lovage oils are both scarce. Fennel oil, of sorts, should be plentiful, as the plant grows wild in many parts of Britain. Celery seeds from India are usually clean and of good quality, and have proved satisfactory for distillation. Peppermint oil is expensive and scarce, but there is still some excellent oil to be had. The dementholised Japanese oil was of so inferior a quality, usually leaving a fishy after-taste in the mouth, that its loss should occasion no regrets.

Onions and Onion Flavouring

It is to be hoped that the onion shortages of 1940 and 1941 will not be repeated in 1942, as undoubtedly onion cultivation is now receiving greatly increased attention. Meantime work has gone on apace on the production of improved artificial onion essences, so that there seems no reason why the food manufacturer should fear having to dismiss this highly important flavour from his repertory. Moreover, judging from displays in the shops, garlic would appear to be far more plentiful here than was the case before the war. Possibly English folk are learning to appreciate this most appetising of all flavours.

Reference has already been made to fruit flavours and fruit-juice concentrates. As already mentioned, *Citrus* juices and concentrates are being imported fairly freely, while *Citrus* oils come in quite good quantities from South Africa, the West Indies, Palestine, and California. Among other foreign produce, I believe, stocks of pineapple concentrates are available. Fair quantities of soft fruit juices, as well as apple juice, were pressed last season, and one leading firm informs me that concentrates are still available. What will happen this season is difficult to foretell, since so much depends on our capricious climate.

(*Continued on page* 166)

Fruit and Vegetable Juices for Health

If the entire blackcurrant crop were made into syrup, it would provide approximately one-fourth the entire needs of the nation for a year. So states the author in discussing the new ways and means of utilising large stores of natural sources of vitamins which have been studied at the Long Ashton Research Station. The author also describes the production of a syrup of high sugar content, in the course of which such diverse things as cider and condensed milk plants have been requisitioned for the work. The availability of a product containing 50-60 per cent. sugar must necessarily be of interest to certain sections of the food industry.

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THE FEEDING of post-war Europe was discussed by Dr. Geoffrey Bourne, of the University Laboratory of Physiology, Oxford, in a contribution to *Nature* (February 14, 1942), in which he refers to the recent findings of Widdowson and Alington. These indicate that " since the war the restriction of fruit in the diet has not been compensated for by an increase in the amount of vegetables eaten, and therefore that the vitamin C intake has been reduced to half that consumed by the same families in 1935 ". It is considered that outbreaks of frank scurvy are not likely unless there is a serious failure of the potato crop. But it was stated recently by Miss Shepherd, dietician at the Hammersmith Post-Graduate Hospital, that gingivitis was very prevalent, this indicating that some slight deficiency of vitamin C already existed. Our present problem would seem to be closely associated with the provision of sufficient vitamin C for our own people during the rest of the war.

Vitamin Supply to Children

The Ministries of Food and Health have carried through an enlightened policy of vitamin supply to young children during the past six months. Orange syrup and blackcurrant *purée* and syrup have been prepared in very large quantities for distribution through clinics and food offices, and despite the publicising of the scheme by the popular press as the " great fruit juice flop " there can be no doubt whatever that a very important function was fulfilled by this Government programme. The growing pains of the distribution scheme were not unduly protracted, and after a few weeks a steady flow of *purée* and syrup was finding its way to those whose interest in the well-being of their children prompted them to go to some trouble to obtain the necessary permits and supplies. The term " flop " can be written off as a bit of unfortunate journalese, because from the very commencement of the scheme the factories producing the blackcurrant products have been working at the highest possible pressure to keep up with the demand.

Effects of Distribution of Blackcurrant Products

Naturally, the widespread distribution of blackcurrant products throughout the country in this way has resulted in the introduction of the product to a large number of doctors and health workers who had never before thought of any other way of administering vitamin C than in synthetic tablets. The first reactions have been interesting. A certain number of cases of diarrhœa have been noted, but compared with the cases where no trouble was encountered the proportion was quite negligible. The most interesting feature of the blackcurrant story during the past six months is associated with the overwhelming demand for the various products from adults—each one of whom was apparently considered to be in need of the product. It should be mentioned that, by arrangement with the Ministry of Food, the firms producing the *purée* and syrup for the official scheme were allowed to manufacture a relatively small quantity of their two products for sale through chemists' shops—the only proviso being that suitable steps should be taken to ensure that it was only sold for medicinal purposes. The demand has been phenomenal. The small quantities which have been distributed have been swallowed up almost instantaneously, with the natural result that the general public have been under the impression that there were no such products available.

What's in a Currant ?

The average analysis of a fully matured blackcurrant syrup of, say, six months of age, is as follows :

Specific gravity	1·265
Invert sugar	48·0 per cent.
Sucrose	3·0 " "
Citric acid	1·3 " "
" Tannin "	0·4 " "
Ash	0·4 " "
Ascorbic acid	70 mgs./100 c.c.

This syrup has proved to be of remarkable value in the treatment of hyperacidity and duodenal ulcers,

while in recent months the author has on several occasions been asked at a few hours' notice to send samples of the syrup to hospitals or doctors all over the country for the treatment of patients with a variety of illnesses, the most common of all being pneumonia. These occurrences raise the inevitable question as to the actual *modus operandi* of the syrup. The analysis given above suggests that the syrup is rather a *pot-pourri* of materials, all of which have some medicinal significance. Whether the net result is attributable to the effect of one specific constituent or to the combined result of several effects is not yet known, and the position is complicated by the recent observations by Dr. Pollard at Long Ashton, concerning other constituents with very marked vitamin potency in directions other than that of the well-known vitamins such as A, B, C, or D. The preliminary experiments of Dr. Pollard showed a very remarkable range of constituents in very small quantities, and much time must necessarily be taken before each new material is isolated and identified. But, having already proved the potency of one minor constituent in the blackcurrant, it would not be wise to confine the possibilities of active constituents at this stage to those already mentioned. Evidence of a general kind has been mentioned from time to time which suggests that ascorbic acid in the form of a natural fruit product has effects quite different (and more beneficial) from those of pure ascorbic acid in a tablet. The net result of these various observations is to suggest that the vitamin C needs of the nation should be provided as far as possible through the agency of natural products.

The Blackcurrant Crop

It may be presumed that the crop of blackcurrants in a normal season is about 6,000 tons. If converted entirely into syrup and *purée* this tonnage would provide a quantity of ascorbic acid of 6 to 8 tons, although this figure is necessarily very approximate. Dr. Bourne states that the total need for ascorbic acid for the whole nation is 30 tons per annum, although it is doubtful if more than half this amount is actually consumed. The quantity of vitamin C available in a normal crop of blackcurrants is thus seen to account for an appreciable proportion of the needs of the country. Of course, the availability of the vitamin C content of the currants is not dependent entirely on the use of a *purée* or syrup product. It does mean, however, that with the latest methods employed in making these products, the retention of the vitamin is very high, and this is not the case in domestic processes or even in commercial jam-making unless special precautions are taken. For example, it has been stated that blackcurrant jam *can* be made with a loss of only 10 per cent. of the ascorbic acid in the fruit. It is equally well known that the jam *can* also be made with very much greater loss than this!

Rose Hips

The Ministry of Health was responsible last year for the inception of an experimental processing of 200 tons of wild rose hips collected throughout England, Wales and Scotland. It is not possible here to give details of the processing work carried out at Long Ashton and a large factory in Bristol in view of the official report to be published later. It can be said, however, that far from being a straightforward procedure the production of a stable syrup from rose hips is a very complex problem. The extract contains large amounts of indeterminate materials which have a most potent effect on the *p*H system, buffering the extract to a *p*H of about 6·2 and keeping it near that figure even after a considerable addition of organic acid such as citric has taken place. If blackcurrants are considered as a never-ending source of interesting compounds, then rose hips must rank as a good second. Much remains to be learned regarding the actual extraction and stabilisation of the vitamin, but, in the opinion of the author, it should be possible with adequate plant to produce an extract containing 6 lb. ascorbic acid from 1 ton mixed hips.

1,000 tons hips would thus yield 2·7 tons of ascorbic acid. No accurate estimate of the rose-hip crop has been made public, but if an outside estimate of 2,000 tons is considered possible then the vitamin C extractable by known methods would amount to 5½ tons.

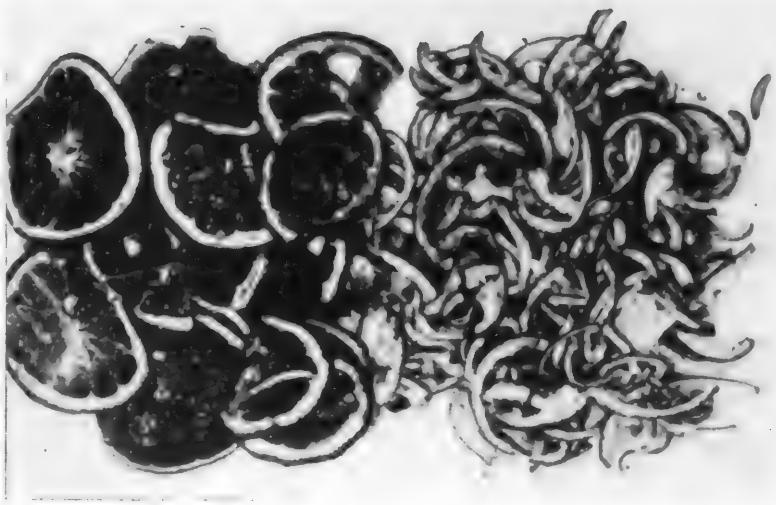
The lack of definite information is felt very acutely at this moment when plans are being made for this autumn's programme. Scottish hips have been reported to contain three times the amount of ascorbic acid and very much less pectin than hips grown in Southern England. This is probably more a varietal difference than the simple effect of climate. However, Scottish hips, processed at Long Ashton last year, did not show such advantageous figures, while the pectin content was such that the extract, perhaps naturally enough, resembled Scotch porridge! But despite this lack of definition in the information regarding the raw material and its later processing, sufficient technical information is available to enable the rose-hip scheme to become a most important and significant Government project.

Carrot Products

It is a far call from blackcurrants and rose hips to carrots, but an experiment has recently been carried out which may be of interest. In view of the probability of an enormous surplus of carrots this spring the National Vegetable Marketing Company became interested in a suggestion from Long Ashton concerning a method for utilising such surplus carrots as were unfit for human food on account of size or condition.

The carrots were to be treated as for apples in the cider industry—*i.e.*, washing and milling and pressing, and drying of the pomace. The juice was to be boiled to coagulate and precipitate proteins, etc., and then, after skimming from the solids, the clarified juice was to be boiled down to a soluble solids content of 75 per cent. and a natural sugar content of 55 to 60 per cent. Eventually the author was asked by the board of the company to undertake on their behalf the processing of 3,000 tons of carrots by the Long Ashton method. On account of the very hard weather conditions in the carrot areas in the late winter, the carrot surplus did not actually materialise, and the programme was necessarily reduced very considerably in extent, but many hundreds of tons of carrots were processed and accurate costings obtained. Cider factories were linked up with milk-condensing plants—both of

(*Continued on page* 154)



Dehydrated sliced oranges and dehydrated sliced peels for use in marmalade.

Dried Citrus Fruits for Marmalade

W. V. CRUESS and JAMES SUGIHARA,

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DURING the present war shipping space to Great Britain is at a premium. Consequently the export of fresh oranges, lemons and grapefruit to that country is practically at a standstill. From accounts received from friends in England, marmalade is practically unobtainable. Fresh citrus fruits from Spain, Palestine and Egypt are very scarce because such fruits must be shipped under refrigeration.

Marmalade is bulky and heavy; consequently it would be costly to ship it to England at present. It is made up chiefly of sugar and water. England and Ireland produce considerable beet sugar, but no citrus fruits.

Because of these considerations it occurred to us that it might be feasible to dehydrate the sliced citrus fruits, greatly reducing their weight and volume and also making them practically non-perishable in nature. They could then be packed in boxes or cartons for shipment by ordinary non-refrigerated freighter to England.

Accordingly, the following experiments, among others, were conducted.

Drying Tests

Whole Valencia oranges grown in Southern California were sliced thin and dried on monel screen trays at 150° F. to bone dryness. Other slices were steam blanched on the screen trays for 6 minutes, and still others were exposed on wooden slat trays to the fumes of burning sulphur for 30 minutes before drying. They were dried in all cases to bone dryness, that is, until brittle and were packed in sealed containers.

The sliced fruit, sulphured in SO_2 fumes before drying, is much the most attractive in colour. The blanched slices darkened somewhat. The unblanched, unsulphured slices were fairly satisfactory in colour. We would recommend sulphuring for commercial practice.

The fruit dried rapidly at 150° F.; namely, in 2¼ to 3 hours for the blanched and 3 to 3½ hours for the unblanched.

Peels were also dried after cutting into narrow strips. The purpose of such product is for addition to a clear or strained extract free of pulp made by boiling the dried, sliced whole fruit with water. The mixture is then cooked with sugar to give a clear jelly with strips of peel suspended therein. This is the " golden shred " type of marmalade of England. The sliced peels dried in 2 hours at 150° F.

The drying ratios were as follows: It required 6·7 lb. of raw, sliced grapefruit or 8·5 lb. of the blanched to make 1 lb. dry; 6·5 lb. raw lemon and 7·7 lb. of blanched; 4·7 lb. raw sliced orange and 5·3 lb. steam blanched; and 3·9 lb. thinly sliced peel to make 1 lb. of the dry. Therefore, it can be seen that saving in weight by shipping the dried citrus fruits compared with the fresh would be more than fivefold. The dried product, as previously stated, does not require refrigeration during overseas shipment. Yields of dried product were greater for the unblanched than the blanched fruits.

Marmalade from the Dried Products

Evidently, drying did not noticeably injure the fruit for making marmalade; as is indicated by the following experiments.

In one experiment the three dried, sliced fruits were mixed in the proportion of 30 grams by weight of orange, 10 of grapefruit and 10 of lemon. To this was

added 750 c.c. or grams of water; that is, 15 parts of water to 100 parts of mixed dried fruits. The mixture of water and fruit was boiled slowly for 1 hour, water being added occasionally to prevent scorching. At the end of the boiling period the weight of fruit and liquid was 550 grams. The fruit had become reasonably tender.

There was then added 400 grams of cane sugar and the mixture boiled down rather rapidly to the jellying point—namely, in this case 220° F. or about 8° F. above the boiling point of water, since the University is near sea level. The marmalade "set up" to a very firm jelly consistency of good flavour and colour. The yield was 702 grams; or 15 grams per 1 gram of dried fruit. However, the pieces of peel were rather tough.

In a similar test with the same proportions and amounts of fruit the dried fruit was soaked overnight in water and then boiled until thoroughly cooked and tender, about 60 minutes. The weight of cooked fruit and juice was 600 grams. To this was added 600 grams of cane sugar; and the mixture boiled down to 220° F. On cooling it also set up to a firm jelly of better and more tender consistency than in the preceding test. The yield was considerably greater—namely, 970 grams or at the rate of 19 grams per 1 gram of dried fruit. The pieces of peel were tender and of good colour and the marmalade of good flavour. The marmalade was of the pulpy type similar to that of some English marmalades.

A Higher Yield Marmalade

In another experiment the sliced, dried citrus fruits in the proportions cited previously were soaked and cooked as in the second experiment previously described; but a greater proportion of water was used. The hot mixture was drained through cheesecloth and lightly pressed; 525 c.c. of "juice" was obtained. Previously 20 grams of the thinly sliced, dried orange peel had been soaked in water overnight and boiled until tender and drained. The drained peel was added to the juice described above, together with 625 grams of sugar. The mixture was boiled down to 220° F. On cooling, a firm jelly-type marmalade was secured. The appearance and flavour were excellent. The marmalade was similar to the golden shred marmalade of England, or to the better California marmalades. The yield was 955 grams; or at the rate of about 13 lb. of marmalade to each lb. of dried citrus fruit.

Vitamin C Content

Marmalade is not eaten for its vitamin C content; but since fresh citrus fruits are rich sources of this vitamin, it is of interest to know whether much of vitamin C remains in the dried product. The following amounts were found by the usual method of extraction with dilute acid and titration with standard dichlorphenol-indophenol solution. The dried sliced orange showed 347 milligrams; the dried grapefruit 403 milligrams per 100 grams of dried product. These would correspond to about 72·9, 58·0 and 55·3 milligrams per 100 grams of fresh fruit respectively. The dried sliced oranges had a relatively higher vitamin C retention in comparison to the other products, as the oranges were exposed to the fumes of burning sulphur prior to dehydration. The reducing action of SO_2 inhibits oxidation and destruction of vitamin C.

Dried Fruits are Satisfactory

These tests showed that sliced citrus fruits can be dried readily and that the dried fruits are satisfactory for making marmalade. If the fruit is lightly sulphured in the fumes of burning sulphur, colour retention is practically perfect and the flavour not adversely affected by the SO_2. The British jam manufacturers are accustomed to the use of sulphured fruits in jam making.

Five lb. of the mixed fresh fruits were reduced to about 1 lb. in drying; a fivefold saving in shipping weight.

In making marmalade of the pulpy type approximately 19 lb. of marmalade was obtained from each lb. of the dried fruits used in the proportions of 30 parts orange, 10 parts lemon and 10 parts grapefruit by weight.

Of the golden shred type marmalade approximately 13 lb. was obtained per each lb. of the dried fruits used in the above proportions.

We recommend to the British buying commission for consideration this method of providing citrus fruits for marmalade making in Britain. Dehydrator capacity in this State (California) is ample for the purpose; and the fruit is plentiful during the winter months.

Reprinted from "The Canner," U.S.A.

Fruit and Vegetable Juices for Health

(*Continued from page 152*)

which type of factories were in the position of having their milling, pressing and condensing plant idle during the period the carrots were available.

Link-up of Cider and Milk Plants

The link-up of these two manufacturing units was not an easy matter, but the very highest praise is due to the various managements concerned for the splendid way in which the initial difficulties were overcome and quickly followed by processing on a standard basis. The thick treacle is now available, and the National Vegetable Marketing Company is anxious that the product should be available to as wide a range of food manufacturers as show an interest in it. Early application will be necessary if bulk samples of the treacle are to be set aside for prospective purchasers.

Source of Carotene

It is desired to use the dried pomace as a source of carotene. The freshly prepared product with 8 per cent. moisture contains an average of 80 to 100 mgs. carotene per 100 grams. The oxidation of the carotene proceeds rapidly in the pomace when stored in sacks, and may reduce the initial content to half or less in two to three months. The carotene extraction should obviously be carried out in the shortest possible time after production of the dried pomace. Steps are now being taken to determine whether this can be done on the experimental material.

Food Inspection

THERE is probably no phase of public health administration which has received greater attention in the past decade than that of food inspection. In addition, the provision of a pure food supply has never before excited so much interest in local administrative bodies, food manufacturers, educational societies and the general public itself. This appears in the original preface of an interesting, instructive and up-to-date contribution* to the literature on the different aspects of food protection and of public health administration, now in its second edition. Eight years had passed since the publication of the first edition, during which period new legislation came into force.

Physiology and Comparative Anatomy

Volume I starts off by dealing with the physiology and comparative anatomy of food animals and some useful illustrated descriptions of the digestive and lymphatic systems are incorporated. It might be of benefit to students to insert in a future edition separate diagrams of the important internal organs of the ox, sheep and pig, to illustrate the differences in size, shape, form, etc. Age indications, sexual differences and ante-mortem inspection are then discussed. Under "Breeds of Food Animals" a short description of each breed could be added with advantage.

In the course of a chapter on the construction of slaughter-houses, the various methods of slaughter, dressing of animals and preparation for sale are described. Valuable suggestions from the Memorandum and Model Bye-laws of the Ministry of Health regarding the erection of slaughter-houses and sketches of the various mechanical apparatus used for the stunning and killing of animals, and the different butchers' tools, etc., are included. The author approves of the inflation of calf carcases and under "dressing", a diagram of the calf pump and attachment is shown in the text.

Meat Inspection

In the chapter entitled "A System of Meat Inspection", under "General Administration", the remarks from the Report of the Departmental Committee on Meat Inspection in 1920 as to the staff required for meat inspection are discussed, and arguments concerning public and private slaughter-houses are well stated. Under "Routine Inspection" the comprehensive and valuable system of meat inspection recommended by the Ministry of Health and issued to local authorities in March, 1922 (Memo. 62 Foods) is set out.

Physiological abnormalities and malformations in animals are treated fully, and very useful information on immaturity, emaciation and poorness, abnormal odour, taste and colour, advanced pregnancy, fœtuses, dead and moribund animals, wounds, injuries, etc., is given.

Other chapters deal with pathological abnormalities and infectious diseases respectively, with separate sections on chronic, septic and contagious diseases.

The inclusion of some suitably coloured diagrams of the pathogenic organisms causing the various diseases would have greatly added to the value of the information given in the sections on diseases, among which the important subject of tuberculosis has been treated at considerable length.

Parasites are covered well, and the various subjects adequately dealt with are: *Diptera*, *Ixodidæ*, *Pediculi*, *Acari*, *Linguatulæ*, *Cestoda*, *Trematoda*, *Nematoda* and *Protozoa*.

The section on the preservation of meat is as complete as the allotted space permits, but the statement on page 280 that ptomaine poisoning may be caused by the consumption of decomposing meat does not conform to the views of modern research.

Fish, Poultry and Game

A large variety of foodstuffs is discussed in the second volume. As the author mentions in his preface, an endeavour has been made to incorporate most of the important developments of food-manufacturing technique and testing, as well as recent legislative amendments.

Although the methods of meat inspection have altered little during late years, many changes have taken place in the preparation and manufacture of other foodstuffs, which require new and appropriate methods of inspection, more especially, perhaps, since the introduction of the Food and Drugs Act, 1938, under which legal procedure has been altered. Food inspection is now a highly specialised work in the Public Health service.

In the chapter on fish, a description, with sketches, and the distinguishing features have been given of the numerous species of food fishes, together with separate sections on marketing, freshness, decomposition, diseases, parasites, and methods of preservation. Edible molluscs and crustaceans are also discussed.

The inspection, diseases and parasites of poultry and game are subjects which have received a good deal of attention in past years—consequently up-to-date practical hints on the examination of these foods will be of value to all engaged in inspectorial duties. A very useful section on rabbits has been included.

Canned Foods

Fruit, vegetables, cereals and canned foods are dealt with. Owing to the enormous increase in the consumption of canned foodstuffs during the last few years the latter chapter, especially the section on methods of examination, should be read with interest by all who have to handle or inspect these commodities.

Milk and milk products have been lucidly and comprehensively described under the following headings: Chemical composition and analysis, Production, Dis-

(*Continued on page 162*)

* *Practical Food Inspection*. C. R. A. Martin, M.R.San.I. Vol. I, Meat Inspection. Pp. 316, with 138 illustrations in text. 15s. net. Vol. II, Fish, Poultry and other Foods. Pp. 275, with 58 illustrations in text. 12s. 6d. net. Second edition. London. 1940.

Food Substitutes

Opinions on the ethics and practice of food substitution in relation to present-day conditions are many and varied. This article presents the views of the works manager of a well-known food manufacturing firm.

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THE Food Substitutes Control Order, 1941, defines a food substitute as " any preparation or product offered or purporting to be capable of being used as a substitute for any food "; " food " having the definition of the Food and Drugs Act, 1938—" any article used as food or drink for human consumption (other than drugs or water) and including (*a*) any substance intended for use in the composition or preparation of food, (*b*) any flavouring matter or condiment, and (*c*) any colouring matter intended for use in food ".

What is a Food Substitute?

The Order covers the whole field of food production, but it should be carefully noted that no attempt has been made to define a substitute as such—the words "substitute for any food" actually appear in the definition of " food substitute "—but, *as defined by the Order*, food substitutes are only those which are offered as, and claim to be, such.

The significance of this is evident if one studies the Order in conjunction with the Food and Drugs Act, 1938. In this Act it is laid down that no food may be offered to the prejudice of the purchaser not of the nature, substance and quality demanded. This condition is readily determined in the case of foodstuffs such as eggs, milk and meat, for which the Public Analyst has well-defined standards, or in the case of manufactured products where an established trade practice is well known. In a case of a *substitute* for these foods, however, on what standards are they to be evaluated? Before the Order came into force, a worthless preparation could be offered as a substitute, with high claims, on just the same terms as a well-devised production which " did the job "—the public could not discriminate without actually purchasing the worthless article, and the Public Analyst had no yardstick by which to measure a " substitute ".

It was to meet this difficulty that the Substitutes Control Order was introduced, and it succeeds in this aim by ensuring that all substitutes are evaluated against their claims *before* being sold to the public. Their formulæ can then be registered and a standard for analysis so obtained.

It is quite clear then that, for example, margarine is *not* a food substitute in the meaning of the Order, but would become one if offered in terms referring it to butter. This fact has no doubt now been recognised by certain manufacturers. On the other hand, almond substitute, though manufactured long before the war, is clearly within the definition of the Substitutes Control Order, and can only be manufactured and sold under a licence given after thorough examination of the preparation and its recipe.

In short, then, it is the claim rather than the nature of the product that brings a food substitute under the provisions of the Control Order, and the authorities thereafter agree a standard with the makers for all products on which such claims are recognised or allowed.

Why Substitutes?

A genuine demand for food substitutes has always existed and has become even more urgent recently. In pre-war days the demand for substitutes was created by the needs of price competition, and so we had egg substitute powder, honey substitute and so on. Convenience of marketing and good keeping properties were also incentives for the replacement of natural products by substitutes.

Now, of course, the driving force is that of supply: anything that will take the place of a foodstuff in short supply will inevitably be in demand, by the public and therefore by the manufacturers. One cannot deny that the efforts made by the sensational press to arouse prejudice against food substitutes in the minds of the public have been at least partially successful, while in other quarters the disfavour attaching to substitutes springs more from an ultra-critical and conservative outlook. Nevertheless, food substitutes have a very important part to play in supplementing supplies in wartime when the nation's diet tends to become increasingly monotonous and uninteresting.

Nutrition and Effectiveness

It will be generally agreed that over and above the legal requirements that no food shall be harmful, or shall be misrepresented, a positive nutritional value is desirable. On the other hand, a food substitute must above all be effective, measured in terms of the palate appeal, appearance and form which it confers. We must here remember that many effective additions to foodstuffs have no real nutritional value—to claim a positive nutritional value, even in the case of such essentials as water or salt, would be dangerous.

It must be remembered that along with the job of allocating and controlling food materials, the Ministry and its advisers have the task of providing all with a diet which will maintain health and efficiency. That it has been successful in this is shown by the Minister's recent claim that the nation is now as a whole better fed than ever before.

It is evident that any serious disturbance of the balance of the nation's food should be carefully watched —that substitutes should only be used to augment and add variety to the standard basic rations which have been carefully worked out. Any possibility that the primary food should on account of cost or convenience be replaced by a substitute would, at present nutritional levels, constitute a danger.

An Example of Effective Substitution

It will be instructive to examine in detail a wartime food specification which illustrates many of the points under consideration—that of the meat content of sausages, now restricted to 30 per cent. In the first place, it is evident that the authorities attach considerable importance to variety and attractiveness in the nation's food—that three wartime sausages with a little bread are considered to be better than one pre-war sausage and a lot of bread! Secondly, while the "filler" is evidently a substitute for the meat previously used, no attempt is made to define the nutritional value of the filler or to relate it to meat—"effectiveness" is the only criterion, and sausage rusk, which is both cheap and effective, is unversally used. Lastly, note that the sausage is extra to the meat ration.

The principle exemplified above is of the greatest importance; it means that the efforts of the food industry should be directed towards the production of the most attractive and appetising goods possible from the materials available. These products may, and preferably will, simulate articles previously made from raw materials which are no longer freely obtainable, and which had in many cases a higher food value.

The plain fact is that the chemist, food expert and manufacturer are on their mettle to produce cakes without eggs and butter, ice creams without milk and cream, pies without meat, and jam without fruit and sugar, without prejudice to the palatability of the article and by the use of wholesome materials suitable for human consumption, with nutritional value *as far as possible* approximating to the original.

It is said of a certain famous chef that he once for a wager prepared and served an army boot for dinner, and it was voted delicious. While so startling a *tour de force* goes beyond present requirements, we are undoubtedly moving towards siege conditions, and the food industry must lead rather than follow in the utilisation of available and perhaps unusual materials in meeting the nation's food requirements.

So long as these preparations are regarded as adjuncts to the nation's diet, to tempt the palate and to attract the eye, they will continue to play a valuable part in maintaining morale on the food front.

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*p*H Control in Sweet Manufacture

EQUIPMENT is now available by means of which the influence that *p*H plays in the manufacture of candy and allied processes can be determined accurately and speedily. For example, in making invert syrup for candy, the optimum *p*H for maximum inversion and highest quality of syrup is 2·5. Since the amount of acid required to produce this *p*H varies with the buffer action of the sugar used, *p*H control is essential. Neutralisation of inverted syrups with sodium bicarbonate should be controlled to prevent discolouration due to excess alkalinity.

In the manufacture of hard candies, since the inversion of sugar during boiling is directly proportional to the hydrogen ion concentration, it is important to know the *p*H of corn syrup, especially if large quantities of this material are used in the manufacture.[1]

The regulation of the acidity of the mixed cane sugar and glucose melts by means of suitable additions is coming into wide use, and *p*H tests, which can be carried out very rapidly, are necessary for the control of this operation.

Similarly, *p*H plays an important part in the manufacture of fondants, fudges, and creams, all of which owe their consistency in part to the degree of inversion which the sugar used in their manufacture has undergone.

Test Papers

Theoretically, as mentioned previously, litmus and other test papers can be used for determining the *p*H of a solution. In practical application, however, the error is usually too great. One of the chief reasons for the inaccuracy of litmus is that the range is so wide that the colour changes are not distinct. This range is *p*H 4·6 to 8·4 which amounts to 3·8 units. It is almost impossible to tell the difference in the colours produced by solutions having *p*H values which differ by 1·0 *p*H unit. In fact, it has been shown in tests made on many different solutions that solutions which specially prepared litmus indicated to be alkaline were, in fact, acid, and *vice versa*.

Perhaps the simplest method of determining *p*H values is by colorimetric comparison. This is simple, economical and rapid, and is accurate provided that the observer can read and match colours. It consists in matching the solution, a reading from which is desired, with various standards. Such a method makes it possible for an observer to obtain results without an expensive outlay in equipment or the services of someone specially trained in this type of work.

Electrometric Method

Another method is the electrometric. This provides a particularly convenient means of measuring the effective acidity or alkalinity of solutions, factors quite distinct from the total acidity or alkalinity, and in many cases more important. The total acidity or alkalinity of a solution (the "total reaction") expresses the total acid or base present, while the effective acidity or alkalinity (the "actual reaction") refers to the acid or base present as ions—that is, dissociated.

The concentration of the hydrogen ions in a solution is a measure of the dissociated acid, and therefore of the effective acidity, while the concentration of the hydroxyl ions in a solution is a measure of the dissociated base, and therefore of the effective alkalinity. As a matter of fact, there are always both hydrogen ions and hydroxyl ions present in definite relation to each other, so that if the concentration of one is known that of the other can be determined also.

The electrometric method measures the hydrogen ion concentration by determining the electromotive force, or voltage, developed at suitable electrodes immersed in the solution. Though this method requires rather more elaborate plant than the colorimetric, it has the advantage that it will, through suitable electrical connections, provide a continuous indication of hydrogen ion concentration, and also a permanent record, if desired, for subsequent reference.

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[1] Randolph, *Manufacturing Confectioner*, August 27, pp. 28-31; Sjostram, *Ind. Eng. Chem.*, 14, p. 941.

The Utilisation of Whey

Cheese whey is a highly nutritious product containing one-half of the milk nutrients and has hitherto been used mainly for animal feeding or else wasted. Its composition is such that it should be used in the human dietary. In this article the authors describe how whey can be utilised for this purpose.

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THE wartime urgency of making the most of our home supplies has necessitated the reconsideration of our pre-war values. This pressing need to exploit to the full all possible sources of human food has again directed the attention of dairying interests to the possibilities of whey. It is now generally recognised that this by-product of the cheesemaking process contains considerable quantities of valuable food materials. Foods do not, however, sell on food value alone, and our attitude to whey is the result of the treatment meted out to this by-product by the dairy industry in days gone by.

Development of Processing

The development of whey processing in this and other countries arose solely from the economic necessity of disposing of the immense volumes of whey produced at our larger cheese factories. The possible food value of such whey was not a consideration present in the minds of the whey owners, who were primarily concerned with the nuisance liability of the whey. The clamant need was for a method of processing which got rid of the whey satisfactorily. Little, if any, consideration was given to the wider question of whether the whey was ultimately put to the best possible use, or whether the best method of processing from the food value point of view was adopted.

Allen[1] has summarised the difficulties in the development of remunerative methods of condensing and drying whey. The relatively low solids necessitate the removal of a larger amount of water during the processing than is the case with other dairy products, condensed or dried. The available market for the finished material was undeveloped and the financial returns from the whey products were low. Technical difficulties not associated with the drying of milk arose in whey processing. It had been assumed that whey would dry in the same way as whole or separated milk, and the failure to recognise inherent differences in the cheese by-product has often given a very inferior and unsuitable article. It should be pointed out that these unsatisfactory features are more often associated with the roller-dried powders, and that recent consideration of the problem has aimed at effecting improvements in the methods of treatment.

Sixty Million Gallons

When it is remembered that whey contains more than one-half of the total solids of whole milk and that over seventy million gallons of milk are converted into cheese annually in Britain, releasing sixty million gallons of whey, it is evident that a very considerable amount of milk solids is available to us. The authors[2] pointed out recently that well-nigh twenty thousand tons of milk food solids are present in our whey supplies. These solids have an exceptional food value and would form an important supplement to our wartime diet, which may suffer severely by the reduction in our supplies of milk and eggs.

The problem to-day is to decide to what degree the food residues in our voluminous whey can best be made available to the public and how the food manufacturer can assist in this problem.

The Composition of Whey

The composition of whey varies slightly with the nature of the cheesemaking procedure, but, as an average, it may be stated as follows:

	Per Cent.
Fat	0·32
Protein	0·90
Lactose	4·80
Ash	0·60
Water	93·38

While whey is commonly regarded as a very watery fluid of little substance it has a much greater food value than its composition and latent energy indicate. Kay[3] points out that unless it is dried or condensed and used as human food, nine-tenths of the vitamin B, three-quarters of the lactoflavin and as much as 90 per cent. of the calcium of the original milk will be fed to pigs or run to waste.

The lactose present fulfils certain physiological functions in the diet. It increases the absorption of calcium and phosphorus in the body. Half of the protein in whey is present as lactalbumen, which is essentially similar to egg albumen and, as such, will reinforce our cereals. The mineral constituents are, like those of milk, varied and many, and must prove of the greatest value these days of somewhat limited milk rations.

Attempts and suggestions to make use of whey for human consumption may be grouped under two main heads. The earlier attempts, based doubtless on the assumption that it was not economic to dry or condense it, aimed at the separation and utilisation of one or more of the whey constituents—*e.g.*, lactose or albumen—while the more recent tendency commercially has been in favour of those methods of whey processing which conserved all the solids of the whey. The latter practice is obviously more commendable, provided the finished products are in a form readily adaptable to human needs and economic costs do not render the operations impracticable.

Albumen and Lactose

It must not be assumed that attempts to utilise whey in human consumption are now being made for the

first time. While a study of the dairying and patent literature shows a rich list of references to the extraction of albumen from whey by many diverse methods and in various forms[2], simple methods would seem to have existed, probably for centuries, in different parts of the world. The practices, followed on many cheesemaking farms where the supplies were relatively small, do not seem to have been feasible or economic when cheesemaking became concentrated in the creamery and large volumes of whey accumulated. It is well known that a flocculent precipitate of albumen is produced when whey is heated to 90°-95° C. In this coagulated albumen the greater part of the residual fat in the whey is entrained, and the material may be removed by skimming or caused to settle to the bottom of the tank to be recovered when the clearer whey is discharged.

A whey product, known in some districts as " fleetings ", was produced on many cheese farms by heating and straining the whey. In Germany and Switzerland *ziger* cheese is made extensively from whey, while from the whey of sheep's milk in Rumania and in Italy we find *urda* and *ricotta*. New attempts to make and popularise fleetings in the Midlands of England are being made at present, and the suggestion that it can play the rôle of cake-filler is well worthy of attention. When mixed with lactic culture and fermented milk, and drained in the manner adopted in the manufacture of cream cheese, a product of greater consistency which might play the part of a spread in place of butter is obtained.

These products are of very considerable food value, and where facilities for large-scale whey processing are not available their manufacture should be considered. By suitable modification the food manufacturer should be able to make these nutritious and pleasing to even the most fastidious. It is, however, unlikely that all the whey could be accounted for in this manner or that it could be regarded as a full solution of the whey problem.

This early practice of utilising the albumen as human food is no doubt partly traceable to the ease with which it may be recovered from the whey. The modern interest in albumen arises from the fact that its heat precipitation and subsequent removal by filtration are necessary preliminary steps in some of the methods used in the extraction of the whey lactose. The albumen recovered commercially has been used as a food for stock and has been ground with lime for use as a fertiliser. Such methods of disposal have not resulted in any great financial return, and alternative uses for albumen have been considered by many workers. The separation of albumen in a soluble form in which it might be used as a substitute for white of egg has been studied by a number of investigators, but, although some of the methods suggested have produced a type of soluble albumen, it is doubtful if any of them have been commercially successful. The fact that a perfect albumen may be obtained at very small cost as a by-product of the meat-packing industry has rendered it uneconomic to produce albumen from whey, but the conditions of wartime may render a fresh approach to the question quite timely.

Lactose has received greater attention than any other of the whey constituents. It is the component present in greatest amount and whey forms the sole source of supply. The extraction of lactose has been the basis of most schemes of whey utilisation, but there is no reason why its production should be greatly increased in wartime unless new national uses render this essential. In the past lactose extraction has given a residual whey, the potential food value and commercial possibilities of which have never been fully realised or exploited in the human dietary. This residual whey, when concentrated, could well form a source of all those food factors associated with the vitamin B complex, and the exploitation of this residual product in the national interest merits greater attention than it has hitherto received. It cannot be too strongly emphasised, in the light of our present nutritional knowledge, that the food value of whey is not merely a question of its albumen and lactose.

Whey Cheese

The people of Scandinavia would seem to be the only enthusiasts for making full use of whey in its entirety. The well-known dairy product, *Mysost*, enjoys great popularity as an article of food in the regular diet of the Norwegian. This whey cheese possesses a unique flavour and, containing as it does all the whey ingredients, is of the highest food value. To the British public the taste of *Mysost* is unusual, and may not be too acceptable at first owing to the concentration of whey salts, but a modified process of manufacture should render the cheese more generally acceptable to our consumers. Food manufacturers are strongly urged to consider the advisability of popularising *Mysost* in this country. Its manufacture consists essentially of evaporating whey to about one-tenth of its original volume. This is carried out in large shallow pans, steam-heated underneath. In the later stages of heating the concentrating mass is stirred vigorously with heavy mechanical stirrers to give a smooth consistency and promote the formation of small lactose crystals. The addition of a small proportion of ordinary sugar syrup and, in some types, of some goat milk or of a small quantity of cream improves the quality, flavour and texture of the cheese. In its softer form in jars or cartons it may be used as a spread, while in its firmer consistency it is sold in blocks and may be cut in thin slices and used in sandwich form.

This appears to be the only case in which whey solids are used in a direct manner, and the *Mysost*-making of the Scandinavians is perhaps the forerunner of the modern methods of whey utilisation.

Dried and Condensed Whey

The various forms of dried and condensed whey preparations made commercially in this and other countries contain all the whey solids, with the exception of the milk fat previously removed by mechanical separation for use in the manufacture of whey butter. This practice is more profitable, and the removal of the fat from processed whey has no particular disadvantage either technically or financially.

Commercial processed whey is obtainable in powder form, in the condensed form known as whey paste and in the more recent sweetened condensed whey. A brief description of the manufacture, properties and possible uses of these products should prove of interest to the food manufacturer.

Whey powder is now made in three different ways. The cheapest and least satisfactory from many points of view is the roller-dried product. It is made with relatively less costly machinery in the cheese factory at

the point of whey production. The equipment consists of large steam-heated revolving rollers, as used for milk-drying. To these the whey in its original condition after separation is fed directly, and on drying is removed from the roller surface by special scrapers. Later improvements have been suggested to condense the whey partially, prior to its being fed to the roller surface. Roller-dried whey powder is decidedly darker in colour than the better quality spray powders, owing to the caramelisation of the lactose by the higher temperatures reached on the rollers. It is a less attractive article. A large proportion of the protein is insoluble, but this point is really of much less importance than is generally believed. The powder may, however, retain up to 15 per cent. free moisture. This latter point is of importance commercially, since it renders the powder liable to mould and cake during storage. During the drying on the rollers the whey comes off as a plastic, gummy substance, which is subsequently ground to fine powder form. These whey granules are perhaps worthy of the attention of the manufacturing confectioner as a possible base for certain types of confections.

Precondensing Methods

The precondensing of whey prior to its complete drying on the rollers is a more efficient method of manufacture and gives a superior product. Other patents have been granted for drying whey. Kraft Company[4] patented a method in which dried whey is added to a concentrated whey which, on further heating, gives a non-hygroscopic powder by a new continuous process.

The spray-dried whey is prepared on similar lines to those used in the production of spray milk powder. A preconcentrated whey is sprayed into a chamber where it comes into contact with heated air. The misty drops of whey form into a dried powder, settling out in a very fine state of division, retaining only 3 per cent. moisture. In appearance it is of a rich, creamy, fluffy and attractive character, of great solubility and commands a price very considerably higher than the roller powder. As the result of the higher price it is reserved for special markets and purposes, being used in the production of modified foods for infants and in other milk beverages. The manufacture of the powder by the spray process necessitates the most elaborate machinery, and it is extremely unlikely that there will be any great expansion in its production under present conditions. Whether the material already produced is being put to the best possible uses nutritionally and nationally may be a matter of controversy.

The most common form of condensed whey is that in which the whey has been condensed under vacuum to about one-tenth to one-twelfth of its original volume. On cooling, the lactose crystallises out and a somewhat pasty mass results. The composition varies considerably with the degree of condensation practised by the manufacturers, from the semi-solid form to the more pasty consistency, and total solids of from 50 to 60 per cent. may be present, including 40 to 45 per cent. lactose, 7 to 8 per cent. protein, 7 to 8 per cent. milk ash and 1 per cent. fat. The product has in the past been used mainly as a supplement in stock and poultry foods, but condensed wheys of a superior quality have been produced during the war by certain manufacturers for use in confectionery. There seems reason to believe that greater quantities of good quality condensed whey could be utilised in confectionery.

Sweetened Condensed Whey

In recent years efforts have been made to prepare from whey new products which would ensure more remunerative returns. Such efforts have progressed along two distinct lines. In one the aim has been the production of fine chemicals such as lactic acid, which is proving of considerable value in many industrial and in certain food processes, and lactates, now being incorporated into baking powders. Only the largest dairy firms can provide the heavy capital for the requisite elaborate equipment for such manufacturing processes.

The other line of approach is of more immediate interest to the food manufacturer at the present time. The object has been the production of more attractive whey products which would find greater favour with the food manufacturer and provide new uses for whey. It is no secret, for example, that stocks of roller-dried powder have failed to find a market, and the whey policy of the Ministry of Food has recently undergone modification in the hope of disposing of the accumulated stocks. One of the most promising of the new products is sweetened condensed whey, and the pioneer in this sphere is an American investigator, Webb, who has given an excellent review of his work and reviewed the possibilities of the new product and its uses.[5] Ramsdell and Webb describe the process of manufacture and some of the properties of the new dairy product.[6] Sweetened condensed whey is made on the same principles as sweetened condensed milk and contains added sugar in amount equal to the total whey solids already present. The investigators point out that their work was undertaken in the hope that it might help to fill the need for a cheap and simple method of preserving whey for human food. The whey was pasteurised by the holding method, additioned with sugar, condensed, cooled and well stirred for a period to ensure small lactose crystals. The product kept well at room temperature for over three months with only a slight darkening in colour. Lower temperature storage gave longer and better keeping properties.

Unsweetened Condensed Whey

Whether the Ministry of Food would sanction the incorporation of sugar in a condensed whey in these days of rationing is not known, but a case could be made for this new manufacturing process if it resulted in any considerable quantity of whey solids being added to the human dietary. It would not, of course, be possible to increase to any great extent the total amount of whey condensed, since the available machinery would be the limiting factor. The advance would lie in the provision of a supply of whey suitable for direct incorporation into foods for human use. As has already been pointed out, it is too frequently assumed that whey is fit only for animal use. Even the policy of the Ministry of Food seems to favour the granting of a priority to whey processing for animal food purposes. Webb has discussed the use of a plain condensed whey in certain foods. His condensed whey differs in the degree of condensation from the product of that name in this country. In Britain condensed whey is in the form of a thick paste, relatively difficult to work with. Webb in America proposes the marketing of a fresh, lightly condensed product which could be delivered twice weekly to restaurants, etc., for addition to their home-produced soups.

Lactose from Whey Powder

The possibility of using dried whey as a source of lactose has been investigated with relatively little success. More recently Leviton and Leighton[7] described a method in which lactose is obtained from spray-dried whey powder in a very pure condition by means of alcohol. What is of more interest to the food manufacturer is that the insoluble protein material left as a residue has high whipping properties, and that the liquid remaining after the crystallisation and separation of the lactose may be distilled to give a liquor of very high vitamin potency.

Possible Uses for Whey

The most obvious and, at the same time, the most satisfactory method of utilising whey is to use it in the fresh liquid condition. Certain practical considerations may render this difficult. Whey production is concentrated in large units well removed from the town, and large volumes of rapidly souring whey are released within comparatively short intervals of time daily. Nevertheless, liquid whey can be of very considerable value to the baker who wishes a substitute for buttermilk now no longer available. In the case of the favourably situated creamery, or where the transport problem is not insuperable, efforts should be made to dispose of the fresh liquid whey to the baker during the cheesemaking season. One large bakery concern in Scotland purchased large supplies of liquid whey last summer, and there appears no reason why this practice should not be extended. The increase in this trade would prove one of the most useful and economical methods of whey disposal. The whey must be pasteurised to a high temperature in the creamery before dispatch, to arrest the lactic acidification and improve its flavour and keeping properties. Such treatment has the additional benefit of increasing the baking value over that of raw unpasteurised whey by rendering the albumen of the product insoluble.

The new whey treatment recommended by the present writers and patented by the governors of the West of Scotland Agricultural College has given a product practically identical in general appearance with milk itself. It has given very satisfactory results when taking the place of liquid milk in our wartime ice cream.

In fact, one may well look forward to its taking the place of liquid milk in our post-war ice cream, thus releasing further liquid milk supplies. The new product should fill a place in the soda fountain and iced drink businesses, mixing as it does much more readily with all types of fruit juices. Our work was really an attempt to make liquid whey a saleable product, since it has always been regarded as of little food value and of less commercial interest. The production of a new milk-like dairy product was a possible means of marketing a very considerable proportion of our vast whey supplies in a form familiar to the potential users. When used in ice cream the maximum demand will coincide with the period of greatest whey production. In its " buttermilk " or fermented form it has taken the place of buttermilk in baking. Buttermilk, with its developed lactic acid, has long been held in high esteem by the baker, but the cessation of cream production and buttermaking and the prohibition of the use of skim milk powder in baking has compelled the baker to resort to substitutes involving labour in preparation and the compounding of new formulæ. The provision of an alternative containing the milk solids and the lactic acid of the original buttermilk gives a product with which the operator is familiar.

It is of interest to the manufacturer to know that one large confectionery concern was prepared to take a daily supply of the new milk-like whey in its sweet condition, which would have necessitated a daily processing of very large quantities of cheese whey. The sweet form has given much better results than any sample of condensed whey hitherto tried in toffee-making by the manufacturer.

In discussing the best utilisation of whey there are several points to be borne in mind. Whey is seasonal and of limited supply. The capacity of the industry to preserve the whey, in one or other form to ensure adequate keeping properties, and give continuous supplies throughout the year cannot be greatly increased in wartime. At the height of the cheesemaking season in May and June the available condensing and drying machinery cannot cope with all the whey supplies, and every effort should be made during this period to dispose of as much whey as possible in its liquid state and relieve the strain on the drying plants. The food manufacturer is perhaps less interested with the dairy problem of whey disposal. He is concerned with the question of suitability of whey and its products as food for direct or indirect use for human consumption.

The Flavour Difficulty

The main difficulty facing the food manufacturer making use of whey products is the pronounced salty flavour which most of them possess. In spite of their high food value, the manufacturer will not use them unless he can successfully hide the unusual, unattractive flavour. This may be possible by the incorporation of selected flavouring materials or by a special treatment of the whey prior to its processing.

Powdered whey and specially fermented condensed whey have been incorporated into processed (crustless or pasteurised) cheese to improve the food value of this article by giving a really " full-milk " cheese. Dried whey has been added to bread for many years with distinct benefit to the consumer. The roller-dried, finely ground powder may be used for this purpose quite satisfactorily. An attempt to persuade the baker to utilise the accumulated stocks of roller powder is now to be made by the authorities.

Whey from Lactose Extraction

In the manufacturing processes for the extraction of lactose a residual whey of very high food value remains. Its satisfactory disposal still constitutes a problem. The usual practice is to convert it into special cattle feeds by the absorption of the residual whey by selected cereal by-products—*e.g.*, bran. The incorporation of this whey residue in foods fit for human consumption would indeed be a great step forward, and it should not be beyond the ingenuity of the food manufacturer of cereal breakfast foods to so modify his methods of preparation as to permit of the utilisation of whey solids of high vitamin, protein and mineral value in a form suitable and attractive to the consumer. It is suggested that oatmeal, for example, could easily and readily be reinforced without any increase in price with a small proportion of dried whey. Such addition would improve tremendously the value of this breakfast food, even though it did necessitate a new name for the

article to avoid any risk of misdemeanour under the Food and Drugs Acts.

The properties of sweetened condensed whey should prove of particular interest to the food manufacturer. This contains 38 per cent. sucrose, 38 per cent. whey solids and 24 per cent. water. The mixture may be added to any food where both whey solids and sugar are desired. It seems to possess particularly good whipping properties, with a high overrun and good standing-up properties. It has distinct uses as an icing material, but wartime regulations may prevent its utilisation for this purpose. Webb comments on the suitability of a dehydrated whipped sweet whey for use in the making of certain porous candies.

Concentrates for Soups

Plain whey concentrates have been found particularly useful in the making of certain cream soups in the manufacture of which coagulation of milk casein has previously caused considerable difficulty. The whey protein gives a relatively soft, flocculent coagulation when the soups are sterilised, and gives a creamier soup. The addition of whey solids to tomato soup results in a product which retains the full tomato flavour and is more easily sterilised. The soup may be boiled and held hot for a time prior to serving, without any risk of undesirable protein aggregations. Simple cream tomato soups may be made from tomato-whey juice with slight additions of flour, which should be useful in these days of communal feeding. There can be no doubt that a soup of tomato and whey will possess the highest nutritive properties and prove sufficiently attractive to please the consumer. The question arises whether our wartime organisation could not arrange for the utilisation by army units, works' canteens, etc., in suitable districts of fresh supplies of condensed whey. The marketing of all our whey powder for use in the army diet is one way in which this valuable material could get across to human use.

Whey-Fruit Mixtures

Of particular interest to certain sections of the catering trade is the work of Webb in his endeavours to make attractive products with whey solids and fruits. The foaming properties of whey have been found very valuable. It may be argued that the provision of such luxuries as fruit mixtures is not essential in wartime. Nevertheless, if these are to be made available they should be as nutritious as possible. Mixtures of fruit juices and whey are simple and cheap to prepare, and are highly nutritious. More "body" is imparted to these fruit-juice drinks if the new, milk-like whey product is added in place of plain whey. Fresh fruit whips can be made by the use of sweetened condensed whey and gelatin in place of egg white. Jam and sweetened condensed whey may be whipped together to give dessert dressings.

The examination of the work of Webb in America promises a definite future for certain forms of whey in this branch of catering, and attempts to can some of his products are of great interest to the food manufacturer.

Cheese whey is a highly nutritious product containing one-half of the milk nutrients. Hitherto it has been used mainly for animal feeding or wasted. Its composition is such that it should be used in the human dietary, and the whole field of whey processing is discussed with a view to improvement in our methods of whey utilisation. There is room for development and exploitation of whey by the food manufacturer.

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Food Inspection

(*Continued from page* 155)

tribution, Sterilisation of utensils, Bacteriology of milk, Bacteriological standards, Methods of examination, Treatment of milk, Milk-borne diseases, and Preserved milk. Cream, butter and cheese.

In the chapter on miscellaneous foods are detailed the methods of inspection and in certain cases of manufacture or preparation, together with conditions of unsoundness or decomposition of the following foods: Meat products, eggs, bread, yeast, confectionery, sugars, jams, marmalade, fermented liquors, aerated waters, vinegar. The essential characters of each food have also been recounted.

Food Poisoning

Under the Food and Drugs Act, 1938, food poisoning has been made compulsorily notifiable. The chapter on this subject will doubtless be of interest and of practical importance to all engaged in the food industry and particularly to Public Health officials.

The legislation controlling the purity of food is contained, for the most part, in the Food and Drugs Act, 1938. The difficulties which students and others have in studying and understanding the various laws and regulations are well known. The various Acts, etc., relating to food need to be set out in as simple a form as possible, and in this the author has been successful.

The two concise and authoritative monographs are veritable mines of information on the science of food inspection, but they are worthy of a more complete index and a few blank pages at the end of each volume for notes would have been useful for students. A useful glossary of terms for the use of students has been included at the end of each volume. Coming from the pen of a practical food inspector, who has drawn liberally upon his lengthy experience and upon data collected during his official duties, the books are of especial value to meat and food inspectors engaged in every-day practice. The demand for a second edition —which has been brought up to date by a careful revision of the first edition and by the introduction of details of fresh legislation—is an indication of the usefulness of the work and the appreciation accorded it.

E. B. D.

The National Bread

From Mr. Thomas H. Fairbrother

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,— I have read with interest Sir Ernest Graham-Little's letter on National Bread in your May issue, and, for once, I am in agreement with his statement that bread is an " unsuitable and indeed unsafe vehicle for irresponsible, compulsory and undisclosed medication in an experiment upon forty million people ".

He was referring to the compulsory addition of 7 ozs. per sack of creta præparata to national wheatmeal flour.

I fear, however, that this compulsory addition of a calcium salt has been forced upon the Ministry of Food by the decision to increase the extraction of flour from 75 to 85 per cent. It would be still more necessary to supplement the diet with more calcium if the bread were made wholemeal, for which Sir Ernest Graham-Little so devoutly pleads. There is no question that the phytic acid present in wholemeal upsets the calcium-phosphorus ratio by throwing out the calcium. Sir Ernest and his friends, therefore, must admit that the calcium in the diet must be augmented. They say not in bread. Then how?

The most suitable natural source of calcium to the body is via milk and milk products, but if we milled only wholemeal there would be a hopelessly inadequate supply of cattle food, and the already short milk supply still further depleted. Sir Ernest and his friends have killed the cow that gave the precious milk.

If Sir Ernest Graham-Little, for a change, would embark on a little constructive criticism, let him tell us how the calcium shortage caused by the use of wholemeal is to be made up, if not by an addition to bread, which, I agree, is quite unsuitable. If he can supply an answer to this he will please and possibly surprise most nutritionists.

I can supply a very simple answer. Go back to white bread, and so use the calcium available unspoiled by phytic acid, and also provide 25 per cent. of wholesome food for cows to give more milk and thus calcium, and for pigs to give more pork and vitamin B_1.

Yours faithfully,

THOMAS H. FAIRBROTHER, M.Sc., F.I.C.,

Director and Chief Chemist, McDougalls, Ltd.

From Dr. E. Graham-Little

SIR,—Mr. Fairbrother writes, " There is no question that the phytic acid present in wholemeal upsets the calcium phosphorus ratio by throwing out the calcium," and therefore " the calcium in the diet must be augmented ". These dogmatic assertions are by no means as axiomatic as Mr. Fairbrother claims, nor is there any evidence whatever for regarding a diet consisting principally of wholemeal bread as being accompanied by the dangers which Mr. Fairbrother envisages.

It is pertinent in this connection that Professor Drummond, chief scientific adviser to the Ministry of Food, in his interesting historical survey with the title " The Nation's Health ", published in the spring of 1940, makes a very significant comparison between the " nutritive value of the poor man's diet " before and after the introduction of the steel roller mill in the eighties. He shows that the amount of calcium per day provided by the 1871 (wholemeal) diet could be estimated as 0·7 grammes; after the introduction of roller milled flour as 0·5 grammes. A comparison in the same work of " stone-ground white flour " with " straight-run roller milled bleached white flour " gives the figures for calcium in the first product as 50 mg. per 100 grammes; for the second product only 22 mg.

A very impressive plea for return to wholegrain bread was conveyed in a communication to *The Times* on October 26, 1940, by the late Sir William Bragg, then President of the Royal Society. He wrote: " Science is built on the accumulation of experiences, and every scientist knows that he must not base his conclusions only on the last few experiments in the laboratory; he must take into account all that has been done before. . . . Practice is based on the experiments of innumerable years. Now, in this matter of food the scientist is at the present time insisting that certain old ways are best, and it is queer he should be supposed to be trying to introduce fads that have no merit but novelty."

Sir William noted the modern deterioration of the nutrition of our people " as compared with any time within the last 200 years ", and attributed this unhappy result to the change from the former national diet of " milk, vegetables, fruit and wholemeal which has been replaced by white bread and meat as the principal foods for a great deal of the population ".

The Minister of Food himself, in his speech on December 19, 1940, admitted that he " had been impressed by the unanimity of scientific opinion on the nutritive value of wholemeal bread " as compared with the white bread, which, at the time of his speech, was supplied to 95 per cent. of the population. Mr. Fairbrother, although he professes to agree that bread is a wholly unsuitable vehicle for irresponsible medication, asks me to suggest " how the calcium shortage *caused by the use of wholemeal* is to be made up, if not by an addition to bread ". I challenge Mr. Fairbrother to produce a shred of evidence for the assumption he makes in the words I have italicised.

Calcium deficiency is produced by many factors, but it must not be presumed to exist without expert investigation, and most certainly is not to be treated by blunderbuss mass medication. It is the physician's province to establish the need in the individual and to deal with it *secundum artem*.

The choice of calcium in the form of chalk, the least assimilable of its salts, was opposed by the practically unanimous opinion of the biochemists quoted in your journal in September, 1940.

I submit, sir, that the balance of scientific opinion, both chemical and medical, is enormously against Mr. Fairbother's assumption, which, indeed, seems ridiculous, that wholemeal bread consumed by the vast majority of the human race throughout immemorial

ages, is a positively dangerous product requiring the artificial addition of calcium to make it safe!

With regard to Mr. Fairbrother's charge that the higher extraction loaf (85 per cent.) " has killed the cow ", an interesting report has just reached me from Dr. Wokes, regarding the results of experiments " undertaken at the request of the Ministry of Agriculture to test the effect of feeding cows and hens on dried potato slices prepared in the sugar beet factories ". The results indicate " the possibility of using the potatoes not required for human consumption to replace a considerable proportion of the cereal products usually eaten during the winter by dairy cattle. Thus very large quantities of cereal products of high food value can be rendered available for human consumption, while the national milk production does not suffer and may even be increased ". The same encouraging results were obtained in the experiments with pullets.

As Mrs. Violet Plimmer writes in *Food Values in Wartime*: " The real objection to a higher extraction of the grain may be that it is more profitable to sell the impoverished white stuff as human food, and the more nourishing brown offals to farmers as animal feeding stuff ".

I am, etc.,
E. GRAHAM-LITTLE.

House of Commons,
May 9, 1942.

The Profession of Chemistry and the Community

At the annual meeting of the London section of the British Association of Chemists, the chairman, Mr. W. C. Peck, read a paper with the title " The Profession of Chemistry and the Community ". He said that the many letters and editorials which had appeared during the past year, mainly in *Chemistry and Industry*, demonstrated that improvement in the professional structure of chemistry is in the minds of chemists to-day. He thought, however, that there was considerable confusion in the minds of the contributors as to the direction in which improvements should be made, and that many of the proposals, while at first sight laudable, were based on unsound reasoning.

There had been three basic proposals put forward, although their sponsors had not put any of them clearly, but tended to advocate schemes embodying parts of two or all of them.

The three proposals were:

1. To federate all the existing societies and associations in Great Britain under one body.

2. To organise a real profession of chemistry to include all chemists, from those at the top down to the youngest of laboratory assistants.

3. To create a closed and properly recruited professional organisation of trained persons, to the end that all members should receive a fair and reasonable reward for their services.

Mr. Peck discussed at length the pros and cons of the three proposals, and rejected the third proposal as tending to sacrifice the interests of the community to the sectional interest of chemists, and in the long run would be disastrous to the profession. He favoured the second proposal, and suggested that the position of the laboratory assistant should not be looked upon as a static but a transitional one and essentially a method of entry into the profession. Continuing, Mr. Peck quoted Professor Jocelyn Thorpe's 1930 presidential address to the Chemical Society, when he advocated closer organisation of science and industry and stressed the political strength to be obtained thereby. He called attention to Lord Samuel's assertion at the British Association's conference on Science and World Order, 1941, that scientists feel that they are not merely technicians or abstract theorists, but citizens having special responsibilities to take part in the ordering of human affairs. Thus we see that, whereas science was commonly held to be ethically neutral and unconcerned with politics and social affairs, the scientific worker now is conceded the right to take his part in affairs, which are to-day being so profoundly affected by technological advances.

The mere enlargement of the bounds of knowledge, under modern conditions, cannot be considered as fulfilling the duties of scientific workers. They can no longer be content to allow others to take the results of their discoveries and use them unguided. Scientific workers must accept responsibility for the control of the forces which have been released by their work. Without this help efficient administration and a high degree of statesmanship are virtually impossible. The tendency to exalt intuition and depreciate intellect which has influenced political movements in Germany and Italy can be traced to the psychology of Freud and his school, and to the philosophy of Bergson and Nietzsche.

In concluding a plea for the realisation by scientific workers that the value of their work depends upon the understanding of it and fundamentally on the acquisition of a scientific outlook by the community at large, Mr. Peck recalled the collapse of the British dyestuff industry in the closing years of the nineteenth century. He quoted the opinion of Professor A. G. Green that this could not be attributed to the condition of British Patent Law, nor to the lack of fiscal protection, nor even to a mere lack of scientific research. He (Professor Green) believed that it was due to a lack of appreciation of science by statesmen, industrialists and ordinary citizens. This could not be remedied until the rewards for scientific achievement were made equal to those of other branches of public service, and until the prestige of science had been raised to that degree the ablest men in the population would be deterred from adopting science as a profession. It is not so much the education of our chemists which is at fault as the scientific education of the public as a whole.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in Food Manufacture should not be taken as an indication that they are necessarily available for export.

Wartime Nutrition

Due to advances in food science, the outbreak of the second world war found us in an incomparably stronger position to tackle nutritional problems than in 1914-18. The present situation was described by Professor Drummond in his lecture to the Royal Society of Arts.

TO REVIEW practically the whole of the subject of wartime nutrition in the course of a comparatively short paper is a feat in itself, and that read by Professor J. C. Drummond before the Royal Society of Arts on May 6 was a model which might be studied with advantage by readers of scientific papers as a whole

New Food Ideas

Running through the paper was the insistent theme of the reactions of the people to new and more correct dietetic habits, which has been very much the concern of the Ministry of Food.

There were two main sets of opinion regarding people's attitude to wheatmeal bread. One was that they would like it once they were convinced that it was good for them; the other was that they actively disliked a dark loaf. Professor Drummond did not subscribe to either of these opinions, but his impression was that the majority of people were "conditioned" to the white loaf and gave little thought to the matter. They were certainly apathetic to appeals based on food values. Previous fears of volumes of protest when the National Bread came into general use had been unfounded; no such reaction occurred, and favourable comment was widespread.

Although there does exist a large measure of resistance to new ideas about food, it is not always a matter of the greatest difficulty to change people's food habits. Twenty years ago a big husky navvy would not have dared to be seen drinking a bottle of milk, but there is no fear of ridicule nowadays. Truly the dietitian's task is great when likes and dislikes, as well as such psychological reactions, have to be contended with!

Dietetics Ten Years Ago

Professor Drummond brought out the great advances in food science when he compared the state of knowledge of to-day with that of only ten years ago, when nutritionists were only able to indicate vitamin values in foods by a series of plus and minus signs. As for the last war, we should have probably run into serious nutritional troubles if the submarine campaign of 1918 had continued for another year and had become intensified to the extent comparable with what is being faced to-day, because we had not the scientific knowledge either to foresee them or to devise protective measures.

The invaluable information which Sir John Orr and others had collected from the surveys conducted during the four or five years before the war were referred to. Among other things, it indicated the importance of controlling the distribution of essential foods so that gross nutritional inequalities, revealed by the surveys, should be redressed as far as possible. The total milk consumption was a case in point, and by one measure and another the steep consumption curve income curve of pre-war years has been flattened out. As for post-war conditions, the consumption of milk in some form or another must be raised. The curve must not be allowed to become steep again. Nearly horizontal now, its level must be raised without changing its shape. If this is achieved it will be a direct outcome of our nutrition policy during the present war.

Children's Diet

Reviewing the diet of children, Professor Drummond stressed the fact that it is not only the child from a poor home who is in danger of being badly nourished. He had had in his hands records of the food of boys at exclusive public schools that sent shivers down his nutritional spine!

We often hear eulogies of "good nourishing soup", but although in theory soup-base mixtures are admirable, the chief objection is that they are so filling that it is difficult to get the required 1,000 calories, even with a good chunk of bread, into a child's stomach.

In discussing bread, Professor Drummond said that the wartime nutrition policy that aimed at improving the food value of bread either by use of long-extraction flours or artificial reinforcement will certainly be reflected in post-war developments; he could not predict what line they would take, although he was certain that minimum requirements, at least in respect to vitamin B_1, would be laid down.

A New Method of Flour Milling

A new method of milling has been devised as a result of collaboration in Canada between the Government Cereals Research Department, certain milling interests and Dr. F. Tisdall. This method yields a flour as rich in vitamin B_1 as an 85 per cent. wheatmeal, and containing considerably more of the other important constituents of the wheat berry than the ordinary type of white flour. Here seems to be the perfect solution of the white *versus* brown bread problem—for the flour which is to be known officially as "Canada Approved" is truly white. Incidentally, in order to encourage the production of this type of flour in Canada, the addition of vitamin B_1 to white flour has been made illegal.

Vegetables and Vitamins

The prevention of loss of vitamin C during the cooking and handling of vegetables, especially in large kitchens, where it is necessary to keep the vegetables hot in insulated containers, is practically impossible. Instead of providing 25 mg. of vitamin C, an ordinary canteen meal may contain no more than 5 to 20 mg. A small helping of vegetable salad overcomes the difficulty, affording as it does from 20 to 40 mg. of vitamin C. A great effort is being made through the

Ministry of Food and Board of Education to make the people salad conscious. It is a hard, uphill fight to convince the man-in-the-street that vegetables are a good substitute for fruit in the nutritional sense. An allotment of 300 square yards will provide all the vitamin C required for four people every month in the year, after allowing liberally for wastage and cooking losses, and no less than half the vitamin A.

Food Education

Referring to education about food and food values, Professor Drummond said that, outside Soviet Russia, no such effort as has been made through the Public Relations Division of the Ministry of Food has ever been made before. The campaign might have been a dismal failure had it been presented in scientific jargon about calories, proteins, and vitamins. As it was planned, the basic idea was to draw attention to the natural foods good for health and the best ways of serving them, leaving all but the barest scientific outline to the experts, who know how to fill in the details, and the cranks, who usually do not. It was touch and go in the United States, when the vogue for all the vitamins in the alphabet were offered in tablets, capsules and candies, and threatened at one time to pervert men of standing in the nutritional field. However, there is to be launched in the United States a vast nation-wide and Government-sponsored campaign based on the slogan " Eat good food ".

Food and the Medical Profession

Pointing out that the medical profession in the United States is solidly behind the nutrition drive in that country, Professor Drummond said that we should want more help from doctors. He felt certain that the merits of an 85 per cent. wheaten flour of good quality would have evoked a warmer response from the American doctors as a body than they did here. Medical education in this country is at fault. The average student has few opportunities to get anything like a proper comprehension of a subject vital to his whole life's work. Something must be done to dispel from the medical man's mind that vitamins are a kind of medicine to be prescribed for certain disorders, much as quinine is given to counter malaria!

Proper Feeding and Insurance

It was surprising that those whose job it is to understand the basic principles of insurance had not appreciated years ago that the proper feeding of the people is a question of national insurance. They had got hold of the idea in Canada; one of the largest insurance companies in the Dominion is contributing $500,000 towards the cost of the national nutrition propaganda campaign because they are convinced that is the most promising project for improving health and increasing expectation of life.

War has few virtues, concluded Professor Drummond. One, undoubtedly, is that activity in many fields of enterprise is enormously stimulated. Another is that problems can often be lifted clear of the arena of political dispute. This war of liberation will offer some compensation for the devastation and waste of human effort if it brings nearer by years the day when every man, woman and child can be assured that they will never know the want of the foods on which their health depends.

Flavours in Wartime

(*Continued from page* 150)

Meat Flavour

A variety of synthetic flavours are available, but mono-sodium glutamate represents a serious loss, as, owing, I believe, to difficulty in obtaining suitable raw material, this chemical is no longer manufactured in this country. It would be most useful at the present time, as it enables the flavour of meat to be realistically reproduced. The question of the production of mono-sodium glutamate from material available in this country should be further investigated, as a supply of the chemical would be a great boon to manufacturers of meat products such as sausages, having a low meat content, and would make palatable similar products containing no meat at all, but only vegetable proteins (beans, peas, etc.). Apart from the pure glutamate, there were on the market before the war " vegetable extracts ", both made in this country and imported, which served the same purpose and were very extensively used. One of them at least is still being made, although supplies are limited and difficult to obtain.

Such is the position regarding flavours in wartime. It is not by any means a satisfactory position, but, on the other hand, it is by no means a hopeless one.

Many flavouring materials have become scarce. Some, now, belong to the past—and, we may confidently hope, to the future as well. But an interesting range of flavouring materials remains. After nearly three years of war and its consequent privations the public has tended to become less critical. This should not be taken as an excuse for placing poorly flavoured products on the market when the production of superior ones is quite possible, but as providing a measure of consolation to the manufacturer when improvement, owing to wartime conditions, is not possible. Moreover, I think the public, always so conservative in its tastes in the past, is to-day in a more receptive mood towards new flavours, or perhaps I should say towards new combinations of old flavours and towards flavours so old as to have become forgotten.

Some of the fish cakes on the market impress me as being rather insipid. How much better they would become if judiciously flavoured with a combination of fennel, red pepper, and possibly mace, while some sausage meat might be very definitely improved by such additions as allspice, coriander, sage, mustard, and garlic used with discretion. Some few manufacturers may have tended to become a little careless, thinking, perhaps, that in times of food shortage the public will eat anything, however insipid it may be. Perhaps many folk will, but I venture to think the public will remember those manufacturers who served them well during these difficult times, and those who did not. To their credit, let it be said, there are manufacturers who have taken the utmost pains to maintain quality in respect of the flavour of their products, with the achievement of most satisfactory results.

Flavouring is a specialised art, and in cases of difficulty helpful advice can always be obtained from the leading essences houses. They will advise customers as to what flavours are available for any particular class of food products, while experimentation in blending, even with a limited range of basic materials, may lead to quite attractive and distinctive results.

News from the Industry

MINISTRY NEWS

Indian Ginger

The committee of the General Produce Brokers' Association of London has announced the appointment of Lewis and Peat as purchasing broker for Indian ginger on behalf of the Ministry of Food. The company controls Lewis and Peat (Singapore).

* * *

A Food Inspectorate

A small inspectorate has now been attached to the headquarters of the Ministry of Food for the conduct of special enquiries, the institution of concerted drives against particular activities, and for strengthening the co-ordination of enforcement work in the food divisions. The nucleus of this headquarters inspectorate has been created by the transfer of two enforcement inspectors, Superintendent Askew from the South Western Food Division, and Chief Inspector Barker from the London Division.

* * *

British Agricultural Attaché

In view of the importance of securing the closest possible contacts on current and future agricultural problems, His Majesty's Government in the United Kingdom has established the posts of Agricultural Attaché on the staff of His Majesty's Ambassador to the United States of America and Agricultural Adviser to the High Commissioner for the United Kingdom in Canada.

For the present these two posts are being filled by the appointment of Professor James A. Scott Watson, M.A.

Professor Scott Watson is Sibthorpian Professor of Rural Economy at the University of Oxford. He is also a member of the Agricultural Research Council, the Agricultural Improvement Council, the Agricultural Machinery Development Board and other bodies concerned with the progress of British farming.

Cereal Breakfast Foods

The Ministry of Food wishes to make it clear that the only breakfast foods which are point-rationed are cereal breakfast foods of the "ready to eat" type. Oatmeal and oat flakes, including rolled oats and breakfast oats, are not on the points scheme.

* * *

Food Subsidies Cost

Subsidies to check retail price increases produced net losses of £63,000,000 in the Food Ministry's accounts, according to the report on war expenditure by Sir Gerald Upcott, Comptroller and Auditor-General, for the year ended March 31, 1941.

* * *

Cheese Shrinkage Allowance

The Ministry of Food announced that from April 25, and until further notice, the following average shrinkage loss allowances will operate in respect of imported cheese covered by delivery orders issued by agents (No. 1 Suppliers and Factors) on behalf of the Ministry:

	Per Cent.
Australia	2¼
Canada	2½
New Zealand ...	3¾
U.S.A.	1

* * *

Dehydrated Butter for Britain

The announcement some weeks ago by Professor Riddet, Director of the Dairy Research Institute, New Zealand, regarding the possible export of dehydrated butter from there to Britain has been followed up by the official announcement from Wellington that a contract for the production this season and next season of up to 20,000 tons of pure butter fat has been offered to the New Zealand Government by the Ministry of Food.

The Minister of Marketing says the contract has further strengthened the export butter position.

Wholesale Prices

Wholesale prices in March of industrial materials and manufactures fell by 0·1 per cent., this being the first decline to be recorded since September, 1940, but those of food rose by 0·6 per cent. The Board of Trade index number for last month was 0·2 per cent. higher than in February. The aggregate increases since the outbreak of war were: General index 62 per cent., food prices 75 per cent., and industrial materials and manufactures 55½ per cent.

At September, 1, 1939, the cost of living was 55 per cent. above July, 1914.

* * *

Additions to "Black List"

The Board of Trade announce that they have made a new Order which comes into force on April 18, containing 921 additions to the "Black List" of traders in neutral countries with whom it is unlawful to have dealings of any kind. Copies of the Order—the Trading with the Enemy (Specified Persons) (Amendment) (No. 6) Order, 1942 (Statutory Rules and Orders, 1942, No. 661)—are available at H.M. Stationery Office, or through booksellers, price 6d.

* * *

Tomatoes—not Flowers

This year the supply of tomatoes from British glasshouses alone is expected to be as large as our total pre-war home-grown supply plus those from the Channel Isles and Holland, said Mr. P. C. Kay, president, at the British Flower Marketing Association's annual meeting in London.

Practically the whole of this increase would come from producers who before the war were growing flowers.

To bring about fair distribution the Ministry of Food is arranging for bulk supplies to be moved from principal surplus-producing areas for sale in "deficiency" areas.

Crown Corks for Milk Bottles

The Ministry of Supply have made a Direction to the Tins, Cans, Kegs, Drums, etc., Orders freeing Crown Corks for milk bottles from the restrictions imposed by the No. 6 Order on the use of tinplate for Crown Corks generally.

* * *

Importation of Essential Oils

Application for the importation of the following essential oils should be made on the standard application form in duplicate, addressed to the Ministry of Food, Portman Court, Portman Square, London, W.1: Caraway, grapefruit, lemon, lime, nutmeg, orange, peppermint, sassafras, spearmint and wormseed. Applications in regard to all other essential oils should be addressed to the Import Licensing Department, 1-6, Tavistock Square, London, W.C.1, and should not be made in duplicate.

* * *

Control of Starch made from Wheat

Under Article 2(a) of the Starch and Dextrine (Control) Order, 1941 (S.R. & O., 1941, No. 1,991), the use of sago flour, tapioca flour or tapioca dextrine is prohibited except under licence. The Minister of Food has now made an Order adding wheat and wheat products to the list of prohibited commodities.

The amending Order came into force on May 1.

* * *

Calcium Addition to Flour

On April 13 Major Lloyd George told Sir E. Graham-Little that the Government's decision to prohibit the manufacture of white flour, except under licence, from March 23 necessarily suspended the fortification of flour with aneurin in this country. In view of the changed outlook owing to the reduction of imports it had been decided to arrange for the addition of 7 ounces of calcium carbonate to each 280 lb. of flour. This addition would proceed district by district throughout the country until all flour on sale would be so treated. The date when the loaf would be made entirely from 85 per cent. wheatmeal would vary in different parts of the country, depending on the quantity of white flour in those areas and the necessity for its early use. It was not intended to instruct bakers to distinguish in any way the national loaf carrying the authorised admixture of white flour from that made entirely from 85 per cent. wheatmeal, but the latter, of course, would be slightly darker in colour.

Mr. Montague asked on April 15 whether Major Lloyd George had considered evidence advanced to the effect that the proposal to add calcium to flour was harmful to the public health because of the differences in the quantities of bread eaten by classes of consumers, and whether he had any statement to make. Major Lloyd George replied that he had not done this, because the appraisal of medical evidence on such matters was a function of the committees of the Medical Research Council which advised the Ministry of Food on medical and nutritional problems. He added that Lord Woolton's decision to add calcium to flour was based on recommendations submitted by these expert committees, and had been reached in consultation with Mr. Brown. Answering Sir Henry Morris-Jones, Major Lloyd George said the Ministry of Food was advised by eminent medical men that it was essential to increase the intake of calcium. Sir Henry said this was against the experience of most general practitioners.

Waste Paper Saving

Every day that passes, with its fresh demands from munition factories, makes it more vitally important to save every possible scrap of paper. The salvaging of used paper is now a matter of law, and those who break the law by burning, or in any other way destroying this valuable war material, are now liable to prosecution. The other way in which the war effort is helped is by cutting down the initial consumption of paper, and business concerns and other organisations throughout the country are loyally making every effort to use the least possible quantity.

Manufacturers of tinned goods are using narrower labels (for technical reasons it is seldom practical to print direct on the tin), and housewives are reminded that these labels should be removed and added to their paper collection before the tins go for metal salvage.

Sugar is now issued in paper bags, instead of stout cartons, and the new method of selling a month's tea ration at a time will save a great deal of paper, as will the new all-in-one ration books.

Newspapers have made a voluntary cut of 85 per cent. in newsprint.

All these are big-scale savings, but even the individual can help by radically cutting down the amount of paper he and she puts into use. Always write on both sides of the paper. Use economy labels. Make the few paper bags you receive last as long as possible before adding them to your salvage. Never use new paper for notes—clip together a pad of scrap, instead. Don't doodle. All small things, but a real help to the war effort.

* * *

Chocolate Industry Concentration

Government proposals for the concentration of production in the chocolate industry were announced by Mr. G. J. Harris, chairman of the Cocoa and Chocolate (Wartime) Association, in London recently. He said the industry had been asked to give up a further million square feet of factory space, in addition to the 2,000,000 square feet already surrendered for war purposes.

Certain factories in areas where the demand for factory space or labour was acute would have to close. A scheme for the production in other areas of goods for the closed firms was being carried through.

Space in excess of 2,700 square feet per weekly ton of output would have to be placed at the disposal of the Government. The type of chocolate to be produced in future will be mainly block and filled blocks. The total output of the industry would be substantially maintained.

* * *

Lord Horder

Lord Horder has accepted the presidency of the Food Education Society in succession to the late Sybil Lady Rhondda.

Food Decontamination

Butter, meat, canned food, potatoes and butter beans, contaminated as if they had come into contact with poison gas dropped from enemy aircraft, were decontaminated at a demonstration held recently at Nottingham.

The demonstration was arranged by Mr. Wade, Nottingham's chief sanitary inspector, assisted by sanitary and food inspectors of the Public Health Department, and it was witnessed by food decontamination officers, representatives of the Ministry of Food and members of the food trade in Nottingham.

It was hoped that the demonstration would help in the recruitment of those interested in the food trade to become trained in decontamination work.

Mr. Wade explained that all the meat and other food used was condemned and was unfit for human consumption. There was, therefore, no waste of any food.

* * *

Oxidation-Reduction Balance

A copy of the third edition of a technical brochure dealing with the determination of oxidation-reduction balance by colorimetric methods has been received.

The new edition has been completely revised so as to bring it into line with current knowledge and practice in this field. A résumé of the theory of oxidation-reduction balance is followed by a discussion of the use of indicators, and of the considerations affecting their use in biochemistry, soil chemistry, and other branches of scientific activity. Detailed practical information is given concerning indicators for use in volumetric analysis.

B.D.H. oxidation-reduction indicators are all electrometrically standardised and are standard and uniform in respect of colour and potential ranges. The brochure provides a complete list of these indicators.

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Business Appointment

Mr. Stanley Parkes has been elected to the Board of Gerrard Industries, Ltd., and has been appointed Managing Director. Mr. Parkes was previously General Manager of that company, having been appointed as such in September, 1939.

Salvage of Bombed Sugar

The salvage of foodstuffs damaged by enemy action still continues. Of the total quantity of foodstuffs damaged in this country by air raids up to the end of last year nearly three-quarters has been saved, states *The Times*.

A representative of the Ministry of Food said recently that in view of the appeals made to the public to economise in food it should be emphasised that, so far as bulk stocks were concerned, the country had been extremely fortunate in saving food from destruction. The exact figure of stock thus saved was 73·7 per cent.

One of the best examples of salvage is a very large stock of sugar. The sheds in which the sugar was stored were hit by enemy action and burned to the ground. The sugar was in the basement. Salvage officers immediately called in sugar experts, who gave the opinion that the work of salvage would be well worth doing. This work still goes on.

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The Cocoa and Chocolate (Wartime) Association

The objects of the Association are:

(1) To act during the present war as the representative organisation of the Cocoa and Chocolate Industry, by which term is meant the manufacture of Cocoa, Chocolate, Chocolate Confectionery, Cocoa Butter and Couverture.

(2) To represent the Cocoa and Chocolate Industry in all negotiations concerning the supply and allocation of raw materials to and their utilisation by the Industry, the distribution of its products, supply of labour, control of prices and any other matters affecting the Industry.

(3) To determine, subject to any Order of the Minister of Food for the time being in force, the prices at which, and the conditions under which the goods referred to in Rule 3 (1) hereof produced by the members of the Association may be sold by them.

(4) To perform such other functions as may be agreed between it and the Minister of Food, including the following:

(*a*) To facilitate the equitable distribution of the products of the Industry amongst wholesalers and retailers.

(*b*) To administer or co-operate in administering schemes for the control of prices designed to ensure reasonable prices to the consumer.

(*c*) To administer or co-operate in formulating and administering schemes for the control of production.

(*d*) To act as a clearing house for "Priority Orders" and any orders given by any Government Department.

(*e*) To develop collective action in the Industry designed to secure economies by the simplification of price lists, standardisation of packs, pooling of transport facilities, or by any other similar method.

(*f*) To encourage and co-ordinate mutual arrangements between manufacturers, to maintain production in spite of war damage and/or requisitioning of factories.

(*g*) To formulate and administer schemes of mutual insurance or equalisation of burdens arising out of war conditions or from Government action.

(*h*) To join with the Sugar Confectionery (Wartime) Association in performing any of the above functions in relation to matters which are common to both Associations.

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The Society of Public Analysts

The Annual General Meeting of the Society was held on Friday, March 6, 1942, at the Chemical Society's Rooms, Burlington House, Piccadilly, London, W. 1, the President, Dr. E. B. Hughes, being in the Chair.

The following were elected Officers and Council for the ensuing term:

President.—E. B. Hughes, D.Sc., F.I.C.

Past Presidents (*limited by the Society's Articles of Association to 3 in number*).—F. W. F. Arnaud, Bernard Dyer, John Evans, Edward Hinks, G. Roche Lynch, W. H. Roberts, G. Rudd Thompson.

Vice-Presidents.—H. E. Cox, L. H. Lampitt, T. Rendle, J. R. Stubbs (*Chairman, North of England Section; ex-officio*), J. W. Hawley (*Chairman, Scottish Section; ex-officio*).

Hon. Treasurer.—G. Taylor.

Hon. Secretary.—Lewis Eynon.
Other Members of Council.—N. L. Allport, A. H. Bennett, J. W. Corran, G. Hogan, J. G. A. Griffiths, D. W. Kent-Jones, R. Lessing, B. G. McLellan, M. Olliver, S. G. E. Stevens, C. J. H. Stock, R. W. Sutton, J. B. McKean (*Hon Secretary, Scottish Section; ex-officio*), A. Lees (*Hon. Secretary, North of England Section; ex-officio*).

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Mrs. L. M. Mundy

Mrs. L. M. Mundy, Ph.C., F.I.C., late of Harrison and Self, has entered practice with Dr. C. W. Herd, B.Sc., F.I.C., as Herd and Mundy, analytical, consulting and research chemists, at 14, Old Queen Street, Westminster, S.W.1. (Whitehall 7220.)

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Sales of Sugar by Wholesale

The Minister of Food has amended the Sugar (Control) Order, 1940, which prohibits wholesale transactions in sugar except against permit or other authority granted by or on behalf of the Ministry of Food. The amendment extends the Order so as to prohibit the use or disposal of any such sugar except for the purposes indicated in the permit.

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New Quick-Freezing Process

The low freezing point of sugar syrups has been utilised in working out a new quick-freezing process for foods, invented by Luis M. Bartlett of the Engineering Department of the University of Kansas.

Full details are not to hand at the time of writing, but the new process is said to freeze food twice as quickly at 0° F. as by other processes.

* * *

Filter Press Plates

In many filter press operations the presence of acidic and corrosive liquors is a source of constant trouble and the cause of expensive upkeep. Whilst wooden plates and frames have generally been used in the past they cannot be regarded as satisfactory, splitting, warping and deterioration of the wood being all too common. Keebush is non-absorbent, light in weight (density 1·6), and impervious to the attack of most corrosives, including hydrochloric acid, chlorine acid and its compounds, sulphuric acid up to 50 per cent. conc., sulphurous acid, etc. Furthermore, it is not affected by temperatures up to 130° C. This material is therefore very suitable for use in filter press frames and plates.

Filter press plates and frames are now made in Keebush material—an interesting new development of the Kestner Evaporator and Engineering Co., Ltd.

In addition to filter plates and frames, Keebush valves and taps are being supplied for use with filter presses. The valves and taps cannot leak or drip, as they are glandless, and the closure is made by the depression of a special rubber diaphragm (Saunders Patent). Standard valves from ¼ inch to 6 inches dia., flanged to B.S.T.D., are supplied for working pressure up to 50 lb. per square inch. Taps with conical tapered ends for force fitting into existing press plates are also supplied, and these can be made with plain ends, bib ends, or ribbed ends for hose connection.

Malted Milk

In the production of packeted products for cakes, jellies, etc., huge sifting and blending machines through which the flour and flavouring material pass, extract any foreign matter and aerate the mixture before it passes to the filling and packing rooms. Each machine handles 5 tons—equivalent to 80 bags a day. In the airy, well-lighted filling room, packing is done by hand. White-capped girls deal with as much as 4½ tons of material on each packing bench in an average working day. Cartons are made up into steel-banded parcels ready for delivery. As many as 800 parcels are packed by four girls in a day.

Marshalls, who have six factories, have long been known for their malted milk. Now this is in short supply, their many other products, including Rice Pudding Powder, Master Mix, Custard Powder Substitute and many others, more than make up the balance.

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Changes of Address

The London Office of Petters, Ltd., has been transferred from Bush House, Aldwych, to Surrey House, Victoria Embankment, London, W.C. 2.

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The London Office of the Brush Electrical Engineering Co., Ltd., has been transferred from Bush House, Aldwych, to Surrey House, Victoria Embankment, London, W.C. 2.

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H. C. Stern (formerly of Farringdon Avenue), late of Bush House, have moved at short notice to Craven House, 121, Kingsway, W.C. 2. Telephone: Holborn 6086/7. Telegrams: Glastos, Westcent, London.

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Correction

In the April issue of Food Manufacture it was mentioned that Mr. W. M. Good, A.C.A., was at one time General Manager of Essex Aero, Ltd., and we are advised that this is incorrect, and that Mr. R. J. Cross has acted in the capacity of Managing Director since its formation. He is also the founder of the company.

Paper Saving

It has been recently stated that 80 per cent. of the mail handled by the Post Office is being sent in new envelopes. Apparently many firms consider it *infra dig.* to mail their correspondence, invoices, etc., under cover of anything but new envelopes.

Envo-Flaps, introduced by H. A. and W. L. Pitkin, have been devised to eliminate the use either of new or used envelopes, thus releasing the latter for immediate use for munitions making. They consist of suitably shaped gummed slips designed to secure a folded letter, the address being typed on the back of the actual letter. They also make a contribution to propaganda in support of paper saving, as each slip is printed with the instruction to save envelopes and help the war effort. The saving of paper by the elimination of envelopes is considerable—12,000 average sized ones weighing 120 lbs., while the same number of Envo-Flaps weighs 9 lbs.

* * *

Efficient Homogenising

The operation, technically known as "homogenising", of producing in emulsions by mechanical means a uniform mixture, the particles of which are so finely divided and dispersed as to render the whole entirely homogeneous for all practical purposes, is applied on a very large scale in the production of food. The stability of an emulsion is greatly increased by reducing the size of globules or particles and increasing their dispersion, and the advantage of the process is well known to manufacturers of all foods having emulsions as a basis.

The homogenisation of milk and cream, for example, improves flavour, keeping and other qualities.

In considering the application of a homogeniser two problems arise: (1) The most economical use of relatively expensive stabilisers; (2) making the most efficient use of natural stabilisers already present. These problems are very effectively solved by the homogenisers made by the Brush Electrical Engineering Co., Ltd. By reason of the high efficiency of the patented valve embodied it is possible to effect notable economies by a reduction in the quantities of stabilisers required, and also to obtain better results on lower operating pressures than are generally available. The Brush machines are made in a range of convenient sizes for handling quantities up to 1,000 gallons an hour.

* * *

Proprietary Breads

Owing to the decision to increase the rate of extraction of flour, the Food Ministry has issued a new general license to authorise the continued production of certain diabetic and proprietary breads, provided that at least three-quarters of the flour content is of 85 per cent., or higher, extraction. Production of malt and aerated bread is also authorised, subject to the same condition.

Messrs. G. E. Hughes, of Neath, claim to be the only individual private firm in Wales to be granted a licence to manufacture and sell their own branded speciality bread—"Nature's Pride". They think it would be a good thing if all firms under Schedule 2 were to amalgamate into a society whose main object would be to co-operate with the Ministry of Food to further the efficiency of each individual firm for the collective benefit of the community.

* * *

Argentine Industry

In a review by the British Chamber of Commerce in the Argentine Republic published in the *Chamber of Commerce Journal* for March is recorded some remarkable phases of transition in the finances and economy of Argentina in 1941.

Summing up the Argentine situation in general, the country's productive forces are being sustained by the operation of minimum prices of cereals and linseed, whilst the livestock industry is experiencing a phase of privileged prosperity deriving from the force of international economic circumstances. Manufacturing is going ahead by leaps and bounds. There is a tremendous amount of capital available for investment, this being partly due to the curtailment of travel expenditure, cost of residence abroad, limited outlay on steamship fares, and, last but not least, the almost incalculable influx, or investment, of "refugee" capital. The promotion of new joint stock companies has reached heights smashing all previous records, and a large portion of the invested capital is being applied to heavy manufacturing industries as well as those engaging in the production of drugs, chemical products and clothing in respect of which oversea exporters formerly interested in this market can, generally speaking, say good-bye to their likelihood of having any future participation in its benefits.

* * *

New Vegetable Dehydrating Plant

A new vegetable dehydrating plant to handle Okanagan Valley products is under construction at Vernon, British Columbia. A main part of this new construction of the Appletine Products, Ltd.—a $30,000 project, in its initial stages—will be a 70-foot vertical drier of a new type. When in full operation this drier will be able to handle 120 tons of raw products every 24 hours. So quickly is dehydrating completed that only 30 seconds elapses between the time the raw product enters the plant until it emerges in a marketable form. There is said to be scarcely any loss in food and vitamin content and a saving of space amounting to 80 per cent.

* * *

"600"

This is the title of an entertaining little publication issued monthly by George Cohen Sons and Co., Ltd. In addition to "House News", there are wisecracks, stories and some excellent comic drawings by "Brockbank". Some of the stories sent in for a monthly competition induced in us a somewhat reminiscent mood; the one which gained the first prize goes as follows:

"Parade was due and Murphy's bayonet was missing! Hastily he fashioned a wooden one, which he placed in his sheath. Everything was fine—until the General ordered 'Fix Bayonets!' Murphy, unable to comply, was ordered to explain. 'Sure, Oi cannot fix baynits to-day, Sorr, the anniversary of whin me brother in the Connaughts fell.' 'What the hell has *that* got to do with it?' barked the General. 'Sorr, Oi promised me ould mother Oi'd never fix baynits on this day.' 'Fix your bayonet, man!' roared the General. 'Roight, Sorr!' replied Murphy, 'but may God change ut into a wooden wan!'"

C. and E. Morton Capital

The capital reorganisation scheme of C. and E. Morton, the provision merchants, is not to be revived for the time being. No dividend can be paid at present.

The directors put forward proposals in August last for cancelling 10s. of each of 225,000 £1 8 per cent. Preferred Ordinary, and 5s. of each of 450,000 10s. Ordinary. All preferential rights, including arrears, of Preferred Ordinary were to be cancelled and the shares were to be converted into Ordinary. Arrears of dividend on the £400,000 of 7 per cent. Cumulative Preference capital to June 30, 1940, were to be cancelled.

A circular issued by the Board reminds shareholders that at that meeting of August 27 last the chairman stated that, in view of the opposition shown to the company's proposals, the directors had decided not to proceed with them, but that, after further consideration, a suitable opportunity would be taken of bringing the matter again before the shareholders.

In the meantime, the Board has reconsidered the matter in consultation with the solicitors and auditors of the company, and with important financial interests, including representatives of the Association of Investment Trusts, members of which are substantial holders of Preference shares. These deliberations have led to the conclusion that a reorganisation scheme, to be acceptable to all interests involved, should be based on more stable conditions than those prevailing to-day, and the Board has decided therefore not to pursue the matter further for the present.

The Board is of the opinion that in more favourable conditions a reorganisation will be necessary, and the position will therefore be reviewed from time to time in consultation with the Association of Investments Trusts.

* * *

Express Dairy

The Express Dairy Company has notified the satisfaction in full of a mortgage dated May 25, 1928, securing £50,000, and of a charge dated June 15, 1932, securing £12,000.

Imperial Chemical Industries

Eight per cent. on Ordinary. Interim of 3 per cent. was paid on December 1 last, and final of 5 per cent. now declared will be payable on July 1. Tax from final will be deducted at standard rate for 1942-43 (reduced by relief in respect of Dominion income tax at 4d. in the £). Net income £6,162,212 after taxation and after charging £2,000,000 for obsolescence and depreciation. Approximately £6,400,000 has been provided by the company and its subsidiary companies in the operating groups for national defence contribution and excess profits tax. Total amount available in 1941, including £882,354 brought forward from 1940, £7,044,566. War contingency reserve receives £300,720, and £180,106 goes to workers' pension fund. Provision for dividend on Preference, £1,666,104, and for interim and final dividends on Ordinary, £4,032,149, leaving balance £865,487 to be carried forward to 1942.

* * *

Melhuish (Proprietors)

Wm. Melhuish (Proprietors) is raising its dividend by 2½ per cent. to 15 per cent., less tax, on Ordinary, against 12½ per cent. The companies in which Melhuish (Proprietors) is interested produce flour, baking powder, cakes and other foods. The 1s. Ordinary are quoted 1s. 8d.-2s. 3d.

* * *

Sealing Leaks in Pipelines

Steam and other leaks in steamships, factory plants, pipelines, and other works usually occur in joints or flanges and are generally due to faults in the packing. The object of a useful leak-sealing method is to force a molten elastic substance—Furmanite Compound—into the leaking joint and hold it there until the compound vulcanises and sets hard; thus replacing the faulty packing and making a new, tight and permanent joint.

The essential parts of the equipment are:

The compound; the injector gun which acts in the same way as a grease gun; the jack; wire, lead-strips; flange strap and other packing which are used for the preliminary baffling of the leak; and the adapter nozzles.

The compound, made up in cartridge form for handy loading of the gun, is a semi-plastic solid which melts when heated over the temperature of boiling water, thus enabling it to be forced and squeezed into the minutest apertures such as occur in packings when steam or air or fluid leaks through. It also has the property of being subject to vulcanisation under heat, thus forming a hard, elastic and permanent packing.

The makers are Furmanite Engineering Co. (1939), Ltd.

* * *

Ovaltine Research Laboratories

The 1941 Annual Report of these laboratories has just been received. The laboratories were originally established to control the manufacture of Ovaltine and certain pharmaceutical products. They were subsequently extended to undertake general research work in nutrition. The advantages of access to the well-known Ovaltine farms and consequently the close proximity of raw material to finished products afforded a unique opportunity of studying food values at every stage; first in the diet of cows and hens, next in the milk and eggs they produced and finally in the preparations manufactured from the milk and eggs. In 1940 it was decided to extend further and a special department was equipped for the estimation of vitamins, minerals, proteins and other essential factors by chemical and physical methods, with the object not only of improving processes, but also of undertaking further investigations in the field of nutrition. A brief account of results obtained during 1941 is given in the report. Short papers are published on the following subjects: (1) Fluorimetric estimations of vitamins; (2) Sources of vitamin C, which describes experiments on rose hips and germinated grains; (3) Estimation of protein by the Biuret and Folin colour tests; (4) Replacement of cereals by dried potatoes in cattle and poultry rations. The results of experiments seemed to indicate the possibility of using potatoes not required for human consumption to replace a considerable proportion of the cereal products usually eaten by dairy cattle during the winter.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, April 1, page 106.

PRICE FIXATION ORDERS

No.	*Date.* 1942.	
23	Jan. 7.	Amending the Poultry (Maximum Prices) (No. 2) Order, 1941. (1d.)
32	,, 8.	Amending the Chocolate and Chocolate Confectionery (Maximum Prices) Order, 1941. (1d.)
33	,, 8.	Amending the Sugar Confectionery (Maximum Prices) Order, 1941. (1d.)
60	,, 15.	Prescribing Appointed Days in relation to Northern Ireland for the purposes of the Sugar Confectionery (Maximum Prices) Order, 1941, and the Chocolate and Chocolate Confectionery (Maximum Prices) Order, 1941. (1d.)
79	,, 19.	Amending the General Licence, dated November 12, 1941, under the Oats (Control and Maximum Prices) Order, 1941. (1d.)
87	,, 15.	The Fruit (Canning, Bottling and Freezing) (Control and Maximum Prices) Order, 1942. (3d.)
88	,, 15.	The Vegetables and Vegetable Products (Canning, Bottling and Freezing) (Control and Maximum Prices) Order, 1942. (3d.)
106	,, 21.	Prescribing an Appointed Day for the purposes of the Meat Feeding Stuffs (Control and Maximum Prices) Order, 1941. (1d.)
107	,, 21.	Prescribing an Appointed Day for the purposes of the Horseflesh (Control and Maximum Prices) Order, 1941. (1d.)
108	,, 21.	Amending the Soya Flour (Control and Maximum Prices) Order, 1941. (1d.)
109	,, 21.	General Licence under the Bread (Control and Maximum Prices) Order, 1941. (1d.)
110	,, 21.	Amending the General Licence dated October 1, 1941, under the Bread (Control and Maximum Prices) Order, 1941. (1d.)
112	,, 21.	The Dried Fruits (Control and Maximum Prices) Order, 1942. (2d.)
146	,, 27.	Revoking the Condensed Milk (Bulk) (Maximum Prices) Order, 1940. (1d.)
174	,, 31.	Amending the Saccharin (Control and Maximum Prices) Order, 1941.
177	,, 31.	General Licence under the Home-Grown Rye (Control and Maximum Prices) Order, 1941.
180	Feb. 2.	General Licence under the Soya Flour (Control and Maximum Prices) Order, 1941.
195	Feb. 3.	Amending the Mincemeat and Fruit Curd (Control and Maximum Prices) Order, 1941.
210	,, 5.	Amending the Rice (Maximum Prices) Order, 1941.
257	,, 11.	Amending the Nut Kernels (Control and Maximum Prices) Order, 1941, and the Dried Fruits (Control and Maximum Prices) Order, 1942.
258	,, 11.	Amending the Cereal Breakfast Foods (Control and Maximum Prices) Order, 1941.
259	,, 11.	General Licence under the Chocolate and Chocolate Confectionery (Maximum Prices) Order, 1941.
275	,, 14.	Amending the Eggs (Control and Prices) (No. 3) Order, 1941.
276	,, 14.	Amending the Threshed Home-Grown Peas (Control and Maximum Prices) Order, 1941.
298	,, 18.	Amending the Oats (Control and Maximum Prices) (Northern Ireland) Order, 1941.
316	,, 21.	Amending the General Licence, November 12, 1941, under the Oats (Control and Maximum Prices) Order, 1941.
338	,, 25.	Amending the Imported Canned Meat (Maximum Prices) Order, 1941. (U.S.A. Chopped Lunch Tongues.)
339	,, 25.	General Licence under the Poultry (Maximum Prices) (No. 2) Order, 1941, and the Rabbits (Control and Maximum Prices) Order, 1941. (1941, Nos. 1441 and 1701.)
346	,, 26.	Home-Grown Tomatoes (Maximum Prices) Order, 1942.
349	,, 27.	Amending the Tapioca and Sago (Maximum Prices) Order, 1941.
358	,, 28.	Amending the Hay (Control and Maximum Prices) Order, 1941.
359	,, 28.	Amending the Hay (Maximum Prices) (Northern Ireland) Order, 1941.

CANNED GOODS

22	Jan. 7.	The Canned Fruit and Vegetables (Prohibition of Retail Sales) Order, 1942. (1d.)

COCOA, CHOCOLATE AND SUGAR CONFECTIONERY

61	Jan. 15.	Amending the Cocoa, Chocolate and Sugar Confectionery (Licensing and Control) Order, 1941. (1d.)

No.	Date. 1941.	
		CEREALS
1991	Dec. 10.	The Starch and Dextrine (Control Order, 1941. (1d.)
	1942.	
256	Feb. 11.	The Rice (Control) Order, 1942.
348	,, 27.	The Flour and Flour Mixtures (Licensing and Control) Order,
350	,, 27.	The Wheat Gluten (Licensing of Manufacturers) Order, 1942.
438	Mar. 10.	The Flour and Flour Mixtures (Current Prices) Order, 1942.
452	,, 11.	Flour (Restriction on Use) Order, 1942.
		FEEDING STUFFS
145	Jan. 27.	Amending the General Licence dated December 2, 1941, under the Compound and Mixed Feeding Stuffs (Control) (No. 2) Order, 1940. (1d.)
156	Jan. 28.	The Feeding Stuffs (Rationing) Order, 1942.
157	,, 28.	Directions under the Compound and Mixed Feeding Stuffs (Control) (No. 2) Order, 1940.
176	,, 31.	Directions under the Feeding Stuffs (Rationing) Order, 1942.
290	Feb. 17.	Amending the Compound and Mixed Feeding Stuffs (Control) (No. 2) Order, 1940.
337	,, 25.	Amending the Feeding Stuffs (Rationing) Order, 1942, and giving Directions thereunder.
435	Mar. 10.	General Licence under the Compound and Mixed Feeding Stuffs (Control) (No. 2) Order, 1940. (1940, No. 1119.)
436	,, 10.	Amending the Directions, September 30, 1941, given under the Feeding Stuffs (Rationing) Order, 1941.
		FISH
16	Jan. 7.	The Fish Sales (Charges) Order, 1942, made by the Treasury under Section 2 of the Emergency Powers (Defence) Act, 1939 (2 & 3 Geo. 6, c. 62). (1d.)
285	Feb. 16.	Amending the Fish Sales (Control) Order, 1941.
555	Mar. 27.	Fresh shell fish. (No. 2) Order, 1942. Import Duties Exemption.
		GENERAL
12	Jan. 6.	General Licence under the Food (Restriction on Dealings) Order, 1941. (1d.)
24	,, 6.	Amending the Preserves (Rationing) Order, 1941. (1d.)
34	,, 8.	Amending the Food (Restriction on Dealings) Order, 1941, prescribing an Appointed Day and granting a General Licence thereunder. (1d.)

No.	Date. 1942.	
41	Jan. 10.	Amending the Directions dated January 6, 1940, made under the Rationing Order, 1939. (1d.)
52	,, 13.	The Control of Tins, Cans, Kegs, Drums and Packaging Pails (No. 5) Order, 1942, made by the Minister of Supply under Regulations 55 and 98 of the Defence (General) Regulations, 1939.
111	,, 21.	Amending the Tea (Rationing) Order, 1940. (1d.)
175	,, 31.	The Tea (Restriction on Dealings) Order, 1942.
328	Feb. 24.	Amending the Rationing Order, 1939.
340	,, 26.	Directions under the Food Transport Order, 1941.
357	,, 28.	Coffee (Returns) Order, 1942.
360	,, 28.	Prescribing an Appointed Day for the Purposes of the Food (Restriction on Dealings) Order, 1941.
		MILK AND MILK PRODUCTS
7	Jan. 3.	Amending the Milk (Use of Churns) Order, 1941. (1d.)
347	Feb. 27.	Directions under the Condensed Milk (Distribution) Order, 1940.
607	Mar. 31.	Milk (National Scheme) Order, 1942.
		POINTS RATIONING
129	Jan. 24.	General Licence under the Food (Points Rationing) Order, 1941. (1d.)
130	,, 24.	Amending the Food (Points Rationing) Order, 1941, and revoking the General Licence, dated December 16, 1941, granted under that Order. (1d.)
219	Feb. 6.	Amending the Food (Points Rationing) Order, 1941.
255	,, 11.	General Licence under the Food (Points Rationing) Order, 1941.
315	,, 21.	Amending the Food (Points Rationing) Order, 1941, and Revoking the Canned Fruit and Vegetables (Prohibition of Retail Sales) Order, 1942.
417	Mar. 7.	Amending the Food (Points Rationing) Order, 1941.
		SOAP
211	Feb. 6.	The Soap (Licensing of Manufacturers and Rationing) Order, 1942.
212	,, 6.	Amending the Ships' Stores (Control) Order, 1939.
		VEGETABLES
9	Jan. 5.	General Licence under the Home-Grown Carrots (1941 Crop) (Control) Order, 1941. (1d.)
204	Feb. 4.	Amending the Potatoes (1941 Crop) (Control) (No. 2) Order, 1941, and giving Directions thereunder.
366	Mar. 2.	Threshed Feeding Peas (Control) Order, 1942.

Information and Advice

Lintner Value

7,846. *We are regular subscribers to* FOOD MANUFACTURE *and want to get hold of any standard work that may exist on malt extract in all its forms, uses and chemical reactions on starch in foodstuffs.*

If the Lintner value of any malt extract powder is known, is it possible from that figure to work out mathematically (without laboratory tests) the amount of starch conversion which would take place at a given temperature in a given time, with products such as oatmeal, wheat flour, potatoes, etc.?

If you can refer us to any useful authority on the above points we shall be extremely grateful. (Gainsborough.)

The Lintner value is a value obtained when using a definite kind of starch—*i.e.*, soluble starch—made up to a definite strength, buffered to a definite hydrogen ion concentration, and using a definite temperature in order to obtain a certain degree of conversion of starch to sugars. This figure is very valuable to a brewer as he is able to draw certain conclusions from it, since he knows his own conditions of brewing, but it does not enable any mathematical results to be calculated with other starches and with other temperatures. When using the same diastase one obtains very different results with different temperatures, and it is advisable to state what modification of the Lintner determination has been employed in order to give the value recorded.

The commonest temperatures for the determination of Lintner values are 40° C. or 70° F. In general, one obtains a greater conversion to dextrose at a low temperature, a larger yield of maltose at a medium temperature and of dextrin at temperatures about 70° C., while if the temperature is raised too high practically no conversion takes place. In general, diastase is most active at higher temperatures, but is also most readily destroyed. In the same way it is found that there is a definite relationship between the gelatinisation temperatures of different starches and their rate of conversion.

From the foregoing you will see that you must obviously carry out a number of small-scale experiments to find out exactly what you require.

Some books were recommended.

Yeast Extract

7,857. *I wish to obtain details of the commercial process for the manufacture of yeast extract.*

The conditions which prompt me to make this enquiry are that whereas at present there is an apparent shortage of yeast extract pastes, there is a very considerable amount of surplus yeast produced in my brewery and in other nearby breweries, which in most cases is not used to very good advantage, and which is sufficient, I believe, to warrant collection for use in a yeast extract process, with some West Country town as the manufacturing centre. (Taunton.)

The manufacture of yeast extract is a highly technical business and could hardly be embarked upon on the strength of a recipe. You would need to call in an expert if you contemplated starting manufacture.

Very briefly, the literature gives the following procedure:

The yeast is screened and washed and then debittered. This is done by treatment with dilute acids or alkalies, acetic acid often being used.

The next stage is to extract the liquid portion from within the cells of the yeast. Different ways are employed, live steam being used to rupture the cell with or without the addition of salt. However, autolysis is, we believe, now generally used. After clarification the juice is concentrated, at first in open pans and finally *in vacuo*.

Information Supplied

7,516. *Can you give us any information regarding the manufacture of a substitute for coffee, both from the processing and the raw materials points of view?* (Dublin.)

7,519. *We would be grateful if you could give some names of suppliers of plant for the manufacture of potato flour.* (Cork.)

7,521. *I wonder if you could give me some information, and particularly illustrations, of spices. I am writing a thesis on them, and should be grateful for any help you can give me. I am a domestic science teacher, and therefore am regarding them from the culinary point of view.* (London.)

7,522. *I shall be glad if you could give me names of any suppliers of blackcurrant juice.* (Gloucester.)

7,523. *We require supplies of small rubber bands for holding paper tops on 1-lb. and 2-lb. jam-jars, and shall be obliged if you will put us in touch with suppliers.* (Cork.)

7,531. *We would be greatly obliged if you could inform us of bulk suppliers of malic and adipic acid for use in foodstuffs.* (Newcastle-upon-Tyne.)

7,534. *We wish to ascertain the names of makers of slicing machines suitable for making potato crisps (not chips), and it has been suggested to us that you might be able to assist us in this matter.* (London.)

7,541. *Use of oil of lemon to be used in the manufacture of cordials. Please suggest a satisfactory method for works' use.* (Slough.)

7,545. *In connection with the manufacture of canned soup, we should be obliged if you could put us in touch with any second-hand equipment suppliers. In particular, we are interested in vegetable washers and cleaners, vegetable dicers and soup fillers.* (Blackburn.)

7,550. *I should be glad if you could give me the address of a factory manufacturing potato flour and meal.* (Bromley.)

7,557. *I should be obliged if you could give me names of some suppliers of vegetable dicers and washing equipment.* (London.)

7,559. *In the manufacture of fudges, we make a very good one, but seem to be unable to get a tasteless polish or varnish. We have tried some but the result has been an excellent sweetmeat spoiled because of a strong spirituous taste. Can you suggest anything to help?* (Glasgow.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Improvements Relating to Preserving Foodstuffs in Containers

This invention relates to preserving foodstuffs, such as fruit and vegetables, in containers, such as bags, bottles and jars, and its object is to enable a material in sheet form whereof the container is formed or wherewith the mouth of the container is closed, to become hermetically sealed by the container undergoing a heat-sterilisation process.

The material which is used is a thin sheet of polyvinyl chloride incorporated with sufficient plasticiser normally to be elastically deformable in the cold.

The invention consists in the process of hermetically sealing a foodstuff enclosed in a container formed by, or the mouth of which is closed by, a flaccid homogeneous sheet of polyvinyl chloride plasticised with any plasticiser in actual use or described in the literature for use with polyvinyl chloride and which is non-toxic, consisting in subjecting the container, or container-closure, to the action of boiling water and subsequently cooling.

Preferably the thermo-plastic sheet is used as a cover to close the mouth of a food container, such as a jar. On heating, the sheet conforms to the contour of the rim of the mouth of, and seals, the container.

Most of the very numerous known plasticisers of polyvinyl chloride are excluded from use owing to their undoubted toxicity. Phthalates and citrates can be used.

For instance, the sheet may be compounded from 75 per cent. polyvinyl chloride, with 30 per cent. of a phthalate or citrate—for instance, dimethylglycol phthalate or dibutyl citrate—as the plasticiser.

When used to enclose food or as a closure for the mouth of a food container, only the external surface of the sheet comes into contact with free boiling water, and only about 1 per cent. by weight is extracted from the sheet by the boiling. Such loss of about 1 per cent., however, is quite sufficient to produce the phenomenon of hardening and setting of the sheet on subsequent cooling.

The container—for instance, a glass jar—is almost filled with the raw foodstuff, such as fruits or vegetables, with or without a small quantity of water. The plasticised themo-plastic skin is then applied and stretched taut over the mouth of the container, and its border is folded and pressed down by hand snugly against the neck of the container, and held closely against the neck by enwrapping and tying a hempen string around the folded down border of the skin. In fact, the thermo-plastic jar cover is applied and held on the jar like an ordinary paper jar cover secured by an enwrapped string.

The closed container is immersed in water, which is then heated to boiling temperature and maintained boiling for the period requisite to effect sterilisation of and, if desired, cook the contained foodstuff.

543,090. Walter Engel.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

542,523. LEAN, O. B., BRIAN, P. W., and IMPERIAL CHEMICAL INDUSTRIES, LTD.: Immunising of seed from pest attack.

542,554. MUSCHAMP TAYLOR, LTD., and BRANDWOOD, J.: Impregnating, steaming, sterilising and like processes.

542,560. HEATHER, F.: Filters.

542,568. AUTOMOTIVE PRODUCTS CO., LTD., CLENCH, E. C. S., and CARLTON, Q. H.: Fluid pressure regulating devices for fluid supply systems.

542,574. LAUENSTEIN AND CO., GES.: System of wrapping articles.

542,582. WOOD, D. H., ELLARD, G. P., KING, F., RICKARD, P. E., and AVAMORE ENGINEERING CO., LTD.: Apparatus for transporting foods, and for maintaining foods hot.

542,590. ANSALDO SOC. ANON.: Automatic feed-water regulator for steam boilers.

542,596. GASCOIGNES (READING), LTD., GASCOIGNE, G. H., and KNOX, J. R.: Pulsators for milking machines.

542,605. WALSH, C. L., and MAY, J.: Clarification of liquids.

542,608. BRITISH TABULATING MACHINE CO., LTD.: Magnetisable record cards and statistical machines for use therewith.

542,660. BEASLEY, H. H., and BEASLEY, FRENCH AND CO., LTD.: Glueing or gumming of articles and apparatus therefor.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

WELGAR.—616,530. Bread, biscuits (other than biscuits for animals), cakes, and preparations made from cereals for human use as food. **The Shredded Wheat Co., Ltd.,** Welwyn Garden City, Hertfordshire; Manufacturers.

APRIJELY.—B616,658. Apricot-flavoured jellies (for food). **The Scottish Flavour and Colour Co., Ltd.,** Mayfield Works, 27 to 29, Ratcliffe Terrace, Edinburgh; Manufacturers and Merchants. To be Associated with No. 615,313 (3309) xxix and others.

PRAJELY.—616,659. Jellies (for food). **The Scottish Flavour and Colour Co., Ltd.,** Mayfield Works, 27 to 29, Ratcliffe Terrace, Edinburgh; Manufacturers and Merchants. To be Associated with No. 615,314 (3309) and others.

CHARMOND.—616,681. Blancmange powders, custard powders, baking powders, and food preparations made from cereals. **Mabel Olive Gould,** trading as **Charmond,** St. Cuthbert's Road, Churchtown, Southport, Lancashire; Manufacturer and Merchant.

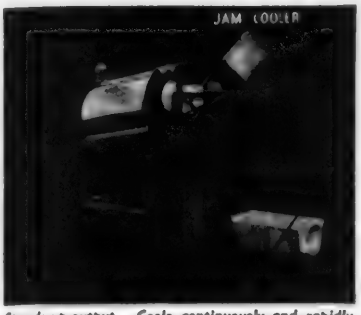
New Companies

J. H. Hodson, Limited. (371591.) To take over the bus. of a yeast mcht. and bakers' sundriesman formerly cd. on by the late J. H. Hodson at 40A, Warrington Road, Wigan. £1,250. Dirs.: Sarah E. Hodson, 1, Falkland Road, Southport; E. W. Johnson, Wallgate Chambers, Wigan; C. Bashforth, Atherton Road, Hindley Green, Lancs (permt.).

Maximillian Food Products, Limited. (371626.) £1,000. Dirs. to be appointed by the subs. Subs.: L. Hazell, 88, Bramshott Avenue, S.E. 7 (secy.); Hilda Haseltine (?), 35, Woodstock Road, N.W. 11 (clerk).

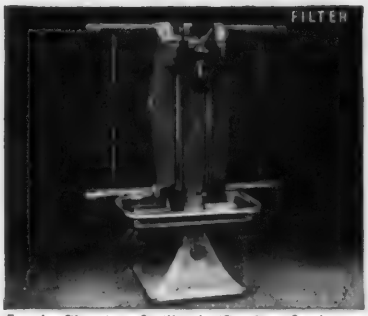
Southern Preserving and Import Company, Limited. (371630.) 63, North Walls, Winchester, Hants. To carry on bus. of mnfrs. and canners of and dlrs. in jams, preserves, foodstuffs, etc. £1,000. Dirs.: H. J. Polder, 64, North Walls, Winchester; H. J. Lillywhite, Frith Lane, Wickham, Hants.

Bakery Holdings, Limited. (371654.) To carry on bus. of an investment, lending and agency co., to carry on directly or by means of subsidiaries the bus. of biscuit and bread mnfrs., etc. £100. Dirs. to be appointed by the subs. Subs.: H. C. Chambers, 194, Rugby Road, Leamington Spa (clerk); A. J. Corbett, 25, Oakfield Road, Selly Park, Birmingham, 29 (clerk).

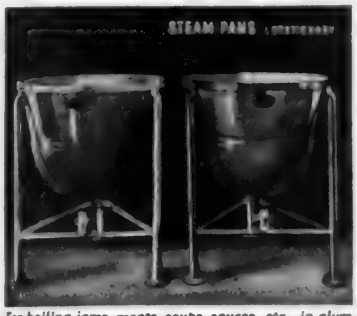


Speeds up output. Cools continuously and rapidly. **Leaflet 200.**

For sieving and separating pips, stones, and skins from fruits and vegetables. **Leaflet 177.**



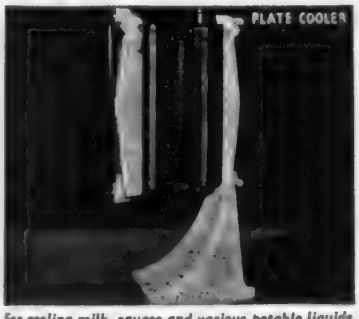
For the filtration of milk, clarification of gelatines and similar purposes. **Leaflet 184.**



For boiling jams, meats, soups, sauces, etc., in aluminium, stainless steel, nickel and monel, for various steam pressures. Smooth welded interiors.
Leaflet 213.

For boiling jams, meats, soups, sauces, etc. In aluminium, stainless steel, nickel and monel, for various steam pressures. Smooth welded interiors.
Leaflet 213.

Legs and framework of cast aluminium. Top of steel plate covered with stainless steel or nickel. Extremely handsome and robust. **Leaflet 151.**

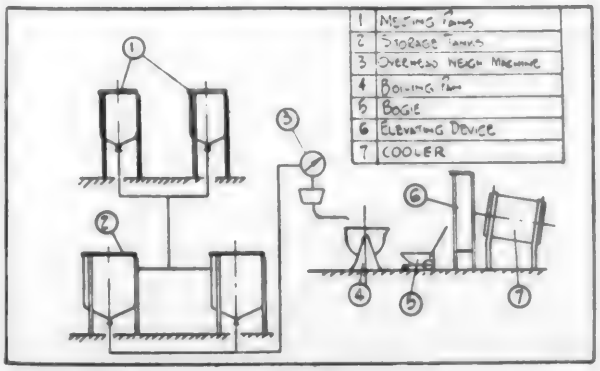


For cooling milk, sauces and various potable liquids. No moving parts. All surfaces in contact with liquids can be quickly exposed for cleaning. **Leaflet 185.**

All-welded heavy gauge aluminium containers reinforced with stout M.S. framework. Easily manœuvred, simple to clean and extremely durable. Various designs made to order. **Leaflet 161.**

Widely used in food factories of all kinds. Light and handy. Containers in aluminium and stainless steel—all-welded. M.S. frames with swivel wheels.
Leaflet 161.

COMPLETE FACTORY LAYOUTS



● Examples of standard A.P.V. Food Plant are shown on this page. In addition A.P.V. construct all-welded plant in Aluminium, Stainless Steel, Monel and Nickel to special designs produced in collaboration with clients. Factory layout schemes for efficient and economic production prepared by experts.

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ALUMINIUM PLANT & VESSEL CO LTD
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"ATLAS" SIFTERS AND MIXERS

"Atlas" Sifters and Mixers will economise labour, give the highest possible yield and enable you to make the most perfect blend in a very short time. Made in our Leeds works by men who have a lengthy experience in the design and construction of Mixers, "Atlas" Sifters and Mixers are good for a lifetime's work.

The Porteus way is the satisfactory way, because Porteus know, from long association with mixing problems, just what is required.

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Size 4 Machine with gear and chain cases removed—can be supplied belt driven or direct motor driven.

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No. 7a size Patent "Atlas" Sifter and Mixer direct coupled to Electric Motor through Double Spur Reduction Gear and fitted with Twin Sifters.

GEORGE PORTEUS & SONS (LEEDS) LIMITED
LEEDS BRIDGE WORKS *Provender Milling Specialists* LEEDS 10

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APPLE PECTIN

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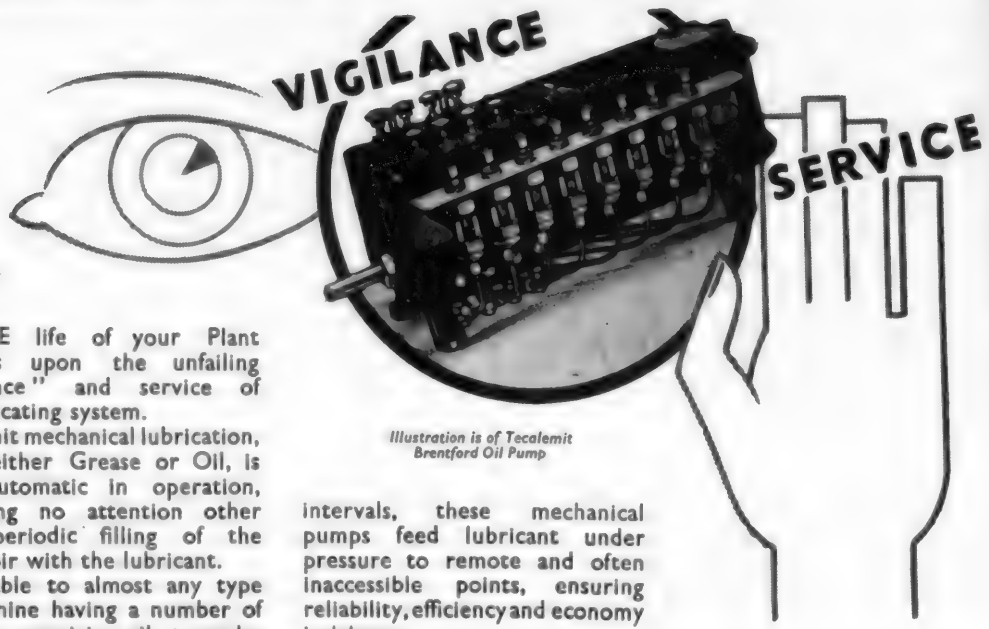

Illustration is of Tecalemit Brentford Oil Pump

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Tecalemit mechanical lubrication, using either Grease or Oil, is fully automatic in operation, requiring no attention other than periodic filling of the reservoir with the lubricant.
Applicable to almost any type of machine having a number of bearings requiring oil at regular intervals, these mechanical pumps feed lubricant under pressure to remote and often inaccessible points, ensuring reliability, efficiency and economy in labour.

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PURDY "WORLD" LABELLERS for bottles, jars, tins, cartons and other packages. Automatic and hand-fed models, placing up to three labels simultaneously on round, flat, recessed or irregular surfaces. Centre gumming. All-round labelling. Top-strapping or sealing. Automatic dating and counting attachments.

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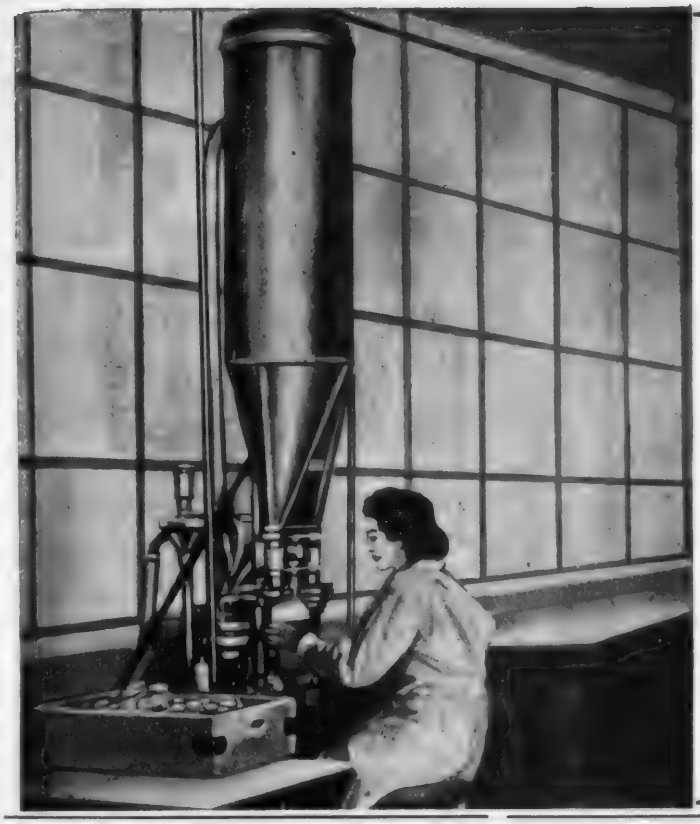

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Albro 2-head Semi-Automatic Vacuum-operated dustless powder filling machine for Custard Powder, Pepper, Spices, Gravy Powder, Health Salts, Milk Powder, etc., etc. Output up to 25 gross per hour. There is an ALBRO Machine for every filling need.

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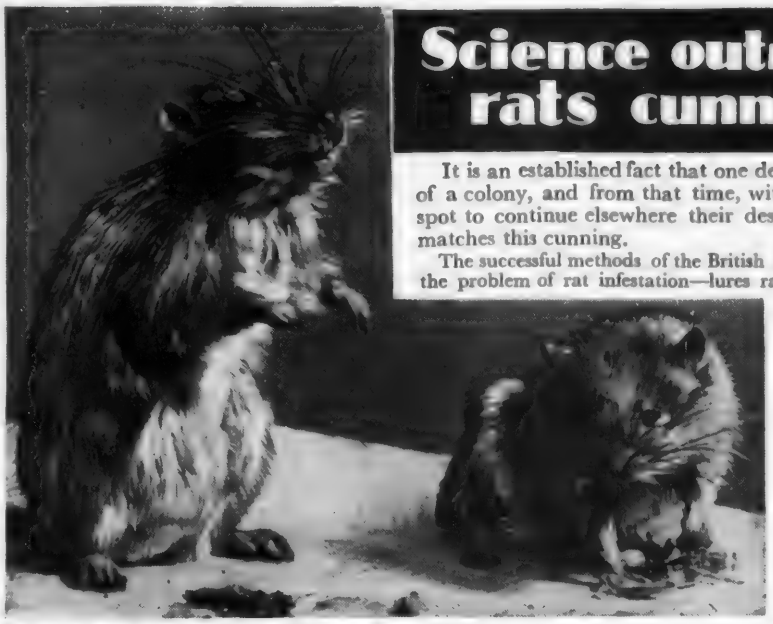

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It is an established fact that one dead rat effectually warns the main body of a colony, and from that time, with incredible cunning, they avoid the spot to continue elsewhere their destructive forays: but today science outmatches this cunning.

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The British Ratin Company has no preparation for sale to the general public: it offers a service only—a service which is harmless to domestic animals and birds.

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Please ask your Surveyor to call and explain how the Ratin Service (preparation not supplied) deals with rats, mice and insect pests

Name.....

Address.....

Date of appointment..... *Time*.....

RATIN SERVICE

First ALLAYS Suspicion **- then DESTROYS Rats**

CITRUS FRUIT JUICES CONTROL

ANNOUNCEMENT BY ALLOCATIONS CONTROL

The following notification is issued by the Advisory Committee in the hope that the information may be of assistance to Users, Importers and Merchants:

(i) Consignments of juice of all varieties have been received and distributed since 1st January, 1942, in accordance with the terms of the Scheme under the directions of Allocations Control.

(ii) The Committee is satisfied that if the quantity of juice which is provided by the revised import programme for the year 1942 is received by 31st December, 1942, imports will compare favourably with those of the datum year—*i.e.*, 1st September, 1938, to 31st August, 1939.

(iii) The Committee appreciate that certain varieties of juice have been in short supply, particularly lemon, but they have reason to hope that additional supplies of this variety will be forthcoming in the near future.

(iv) The policy of the Committee is to distribute consignments of juice to the trade as speedily and equitably as possible; no large stocks are at present being maintained by the Control for future distribution, but a reasonable buffer stock is being held to meet emergencies.

(v) Members of the trade will appreciate that in giving expression to the above views with regard to future supplies the Committee is viewing the matter solely in the light of the information at present available, and that the extent of future importations of juice is dependent mainly upon the maintenance of adequate shipping facilities.

4b Frederick's Place, Old Jewry,
London, E.C.2 *May, 1942.*

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A.C.A.P.
CREAM OF TARTAR SUBSTITUTE
(An Acid Phosphate Double Salt)

WATFORD Solvents and Emulsifying Agents for all Types of Food Manufacture

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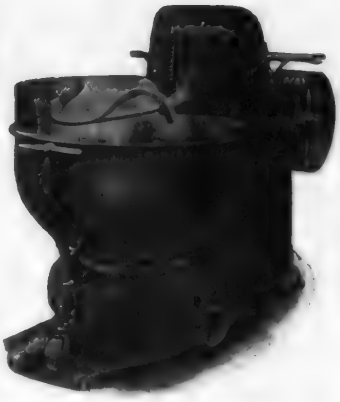
—Charles Moore & Co. Ltd.

Charles Moore & Co. Ltd., Lymm, Cheshire. All enquiries to Sales Managers —Honeywill & Stein Ltd. Wartime Address : Great Burgh, Epsom, Surrey.

MORTON of WISHAW
Makers of GOOD MIXERS



. . for rapid efficient mixing . . .

The Handarm Kneading and Mixing Machine here illustrated is but one of our large range of many different types of Mixers, delivery of which we endeavour to maintain even under present conditions.

We can offer the most suitable mixing or emulsifying plant for all types of foodstuffs.

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Devised for use on all standard sizes of stationery, Envo-Flaps are G.P.O. approved. Every 12,000 save or release for salvage no less than 1 cwt of paper for vital war needs. This enormous economy is achieved without sacrifice either to the security or appearance of the user's mail.

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FERMO-MALT
For malten Sultana Loaves

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The Oat-Flavoured Flour

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The Bakers' utility compound

Bear all these in mind for the future

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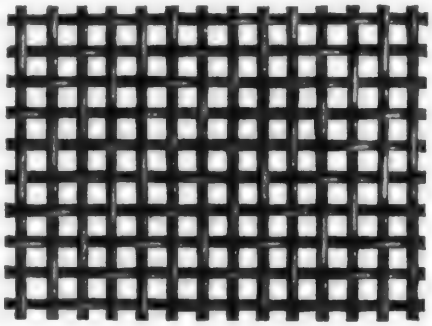

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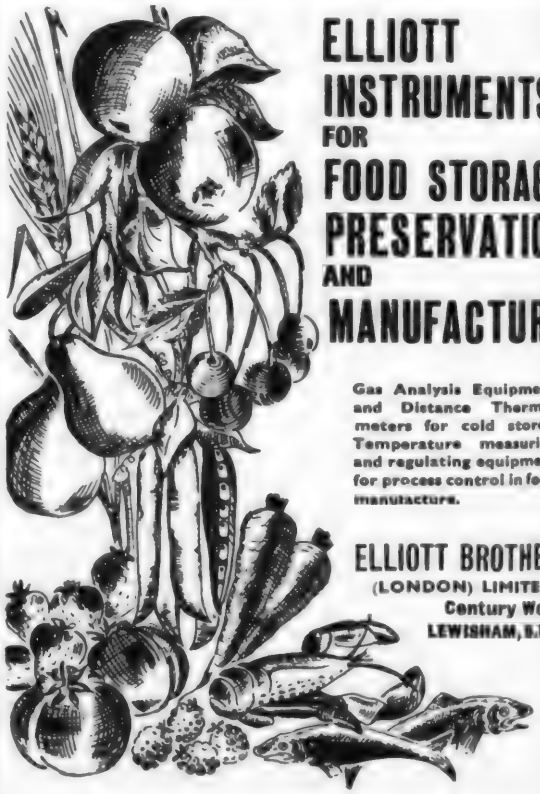
(Proprietors: J. B. BROOKS & Co. Ltd.)



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Gas Analysis Equipment and Distance Thermometers for cold stores. Temperature measuring and regulating equipment for process control in food manufacture.

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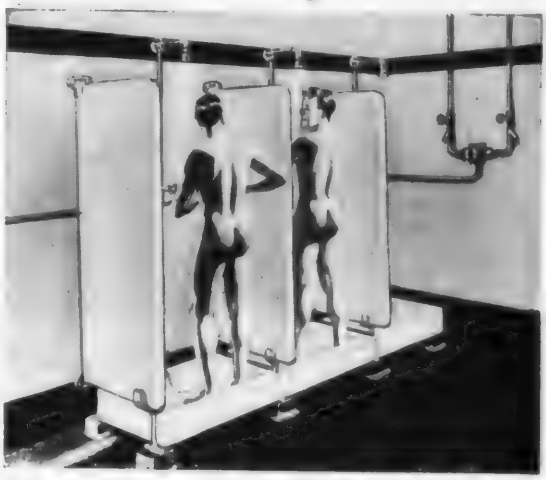
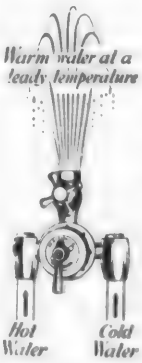
They hold the temperature steady



Leonard-Thermostatic Hot and Cold Water Mixing Valve serving showers.



By means of a quick-acting thermostat the Leonard-Thermostatic hot and cold water Mixing Valve delivers blended water from hot and cold water and keeps it at a steady temperature, in spite of variations in the supply pressures or temperatures. If too much cold comes, the thermostat cuts it down and opens up the hot. If too much hot, it cuts that down and opens up the cold. The Valve will only deliver water at the temperature for which it has been set. Leonard-Thermostatic Valves save water, save heat, save installation costs.

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hot and cold

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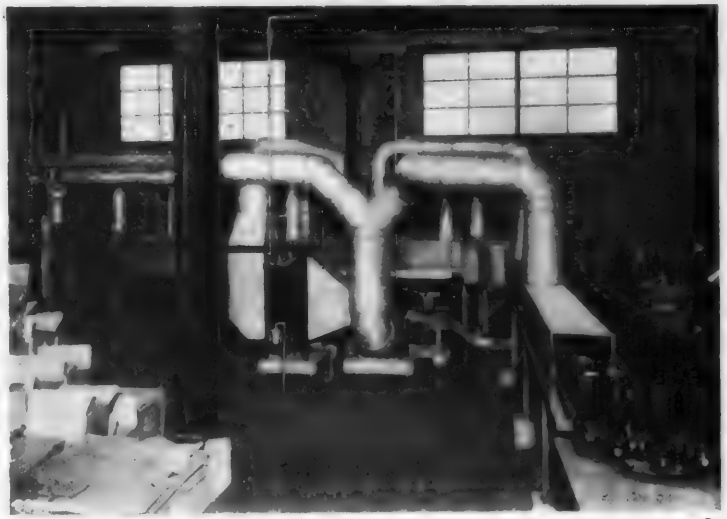

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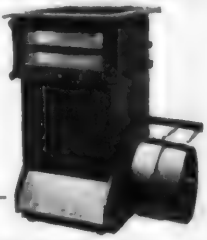

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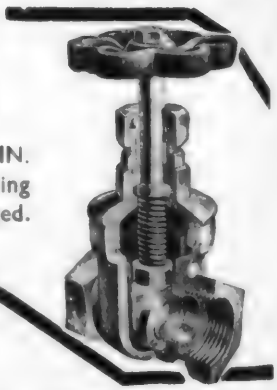

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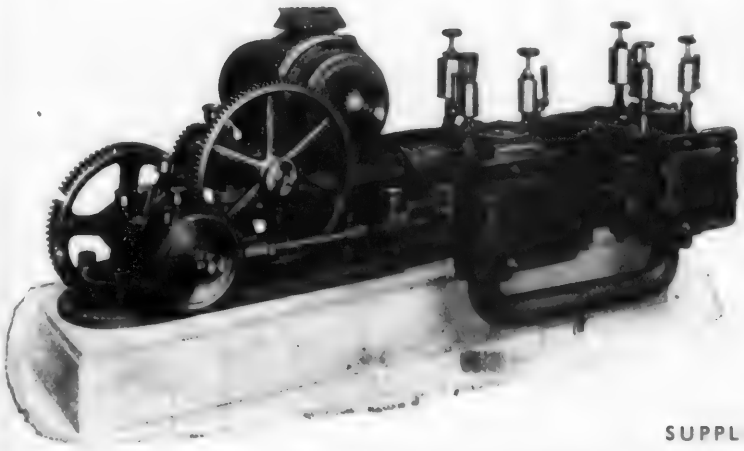

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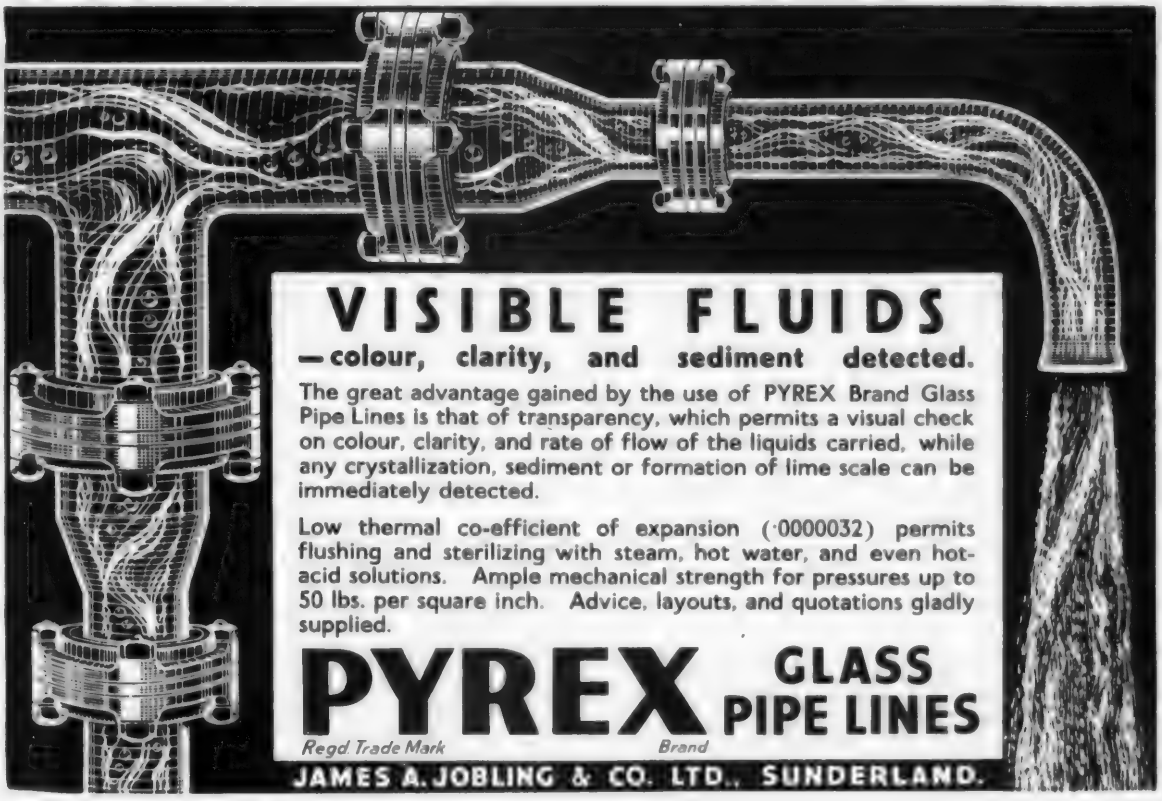

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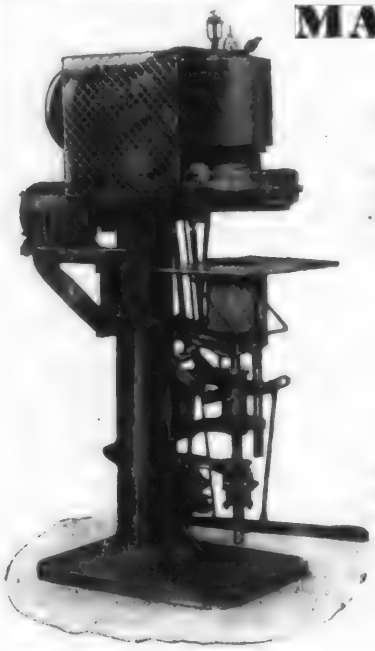

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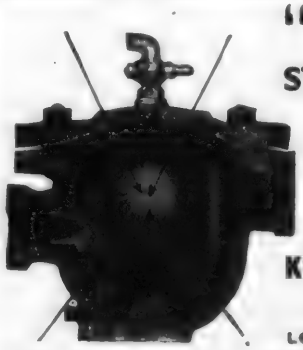

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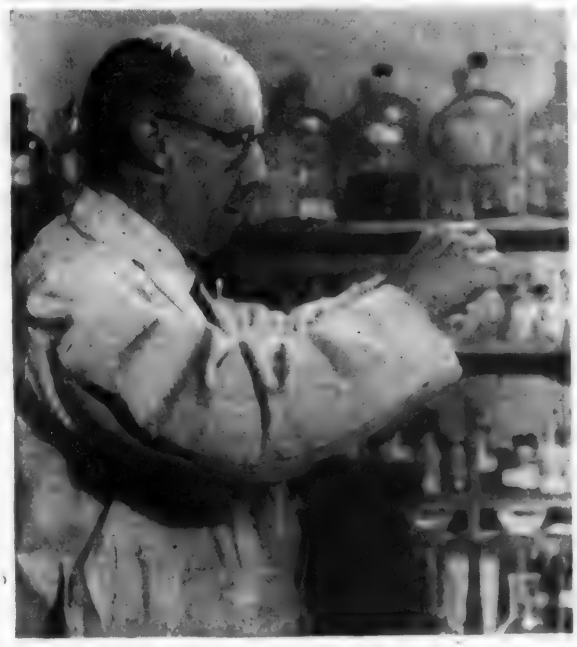

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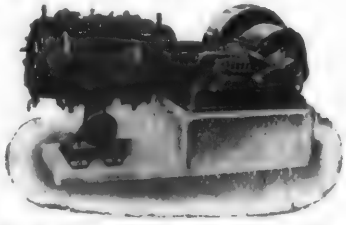

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PATENTS

NOTICE is hereby given that Victor Silberstein, Joseph Charles Kernot and Hatim Attari seek leave to amend the Specification of the Application for Letters Patent No. 543,424, entitled "Improvements in and relating to the treatment of oil or fat containing material for the recovery of oil or fat therefrom." Particulars of the proposed amendment were set forth in the Official Journal (Patents) No. 2780, dated May 6, 1942. Any person may give Notice of Opposition to the amendment by leaving Patents Form No. 19 at the Patent Office, 25, Southampton Building, London, W.C.2, on or before June 6, 1942.

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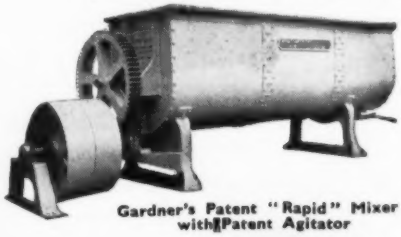

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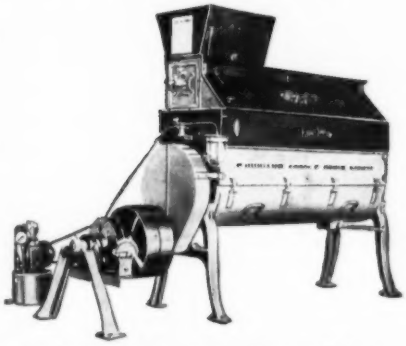

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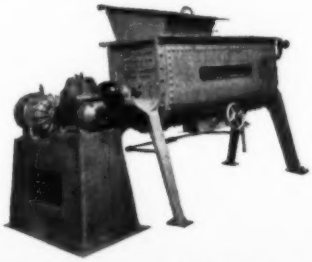

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